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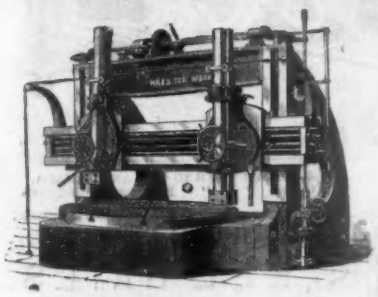

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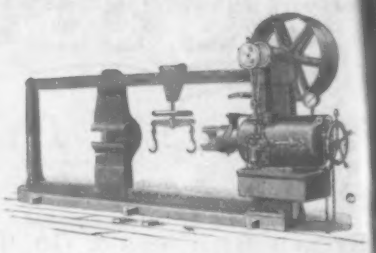

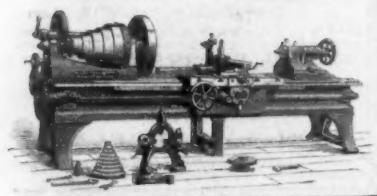

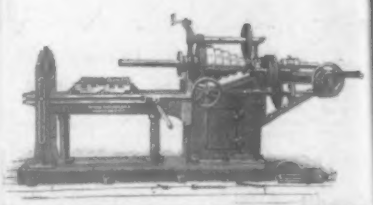

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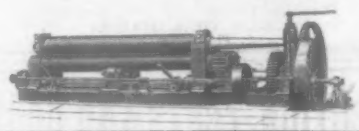

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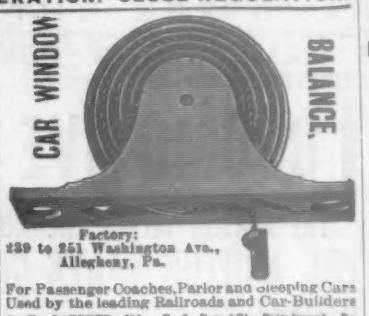

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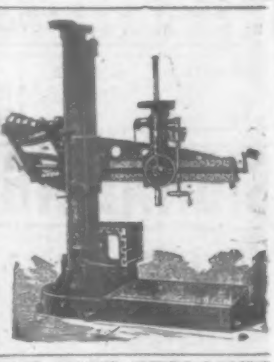

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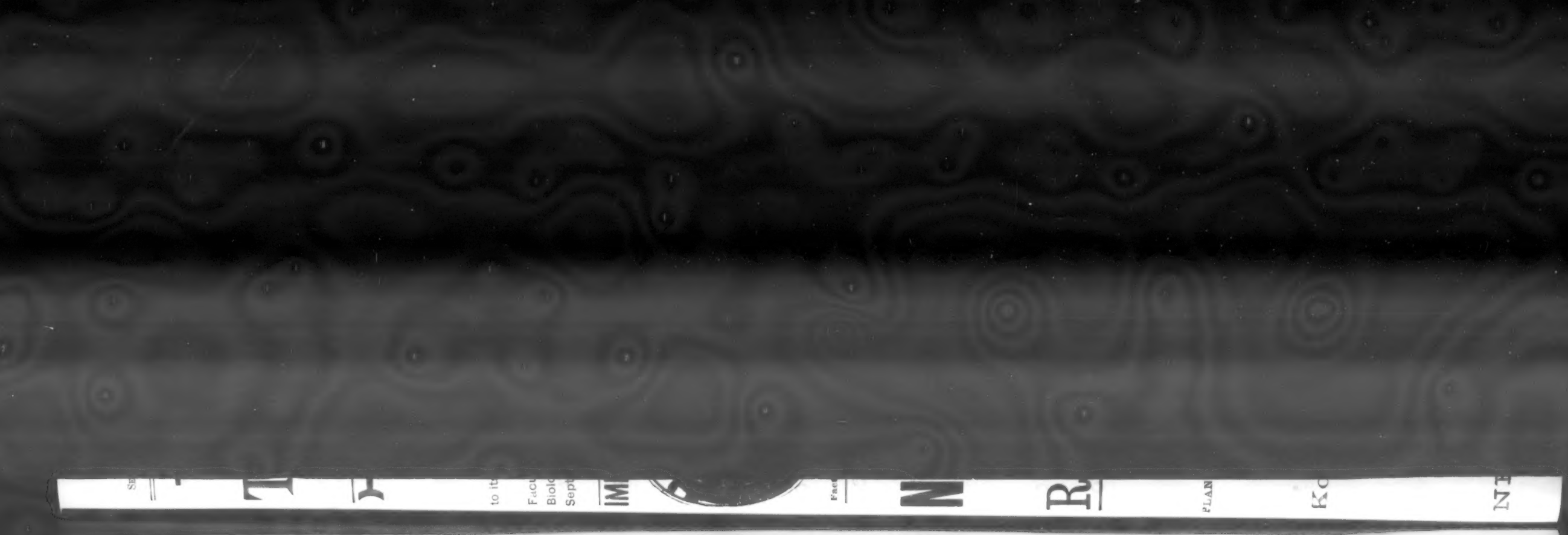

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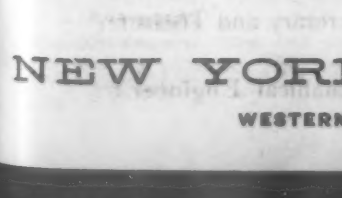

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Egan Co., The 9
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Ensign Mfg. Co. 26
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Eureka Cast Steel Co.
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Farist Steel Co. 18
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Field Water Purifier Co. 10
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Foos Mfg. Co.
Fowler, Geo. L. 13
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Gates Iron Wks. 31
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Goulds Mfg. Co. 21
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Hall Signal Co. 19-20
Halsey, Jas. T. 39
Hammett, H. C. 34
Hartford Steam Boiler I. & I. Co. 17
Harvard University (Eng. Dept.) 7
Harvey Steel Car Co. 26
Hayes Tool Co. 13
Heller & Brightly 15
Hendricks Bros. 35
Hildreth, R. W. & Co. 13
Hinckley Brake Co. 31
Hinson Car Coupler Co. 28
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Hoosac Tunnel Route 31
Hope & Co 34
Hopkins, D. A., Mfg. Co. 13
Howard Iron Wks. 9
Howson & Howson
Humphreys & Sayce. 13
Hunt, C. W. Co. 15
Hunt, Robt. W. & Co., The 1
Hutchins, C. B., & Sons 40
Illinois Central R. R. 31
Illinois Steel Co. 18
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Ingersoll-Sargent Drill Co. 17
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Jackson & Woodin Mfg. Co. 37
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L. S. & M. S. R. R. 35
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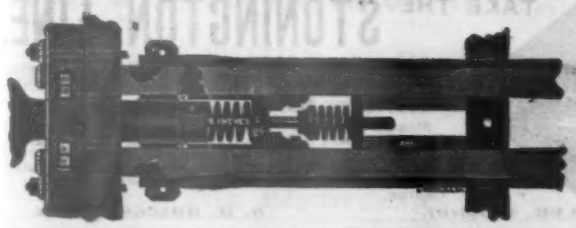

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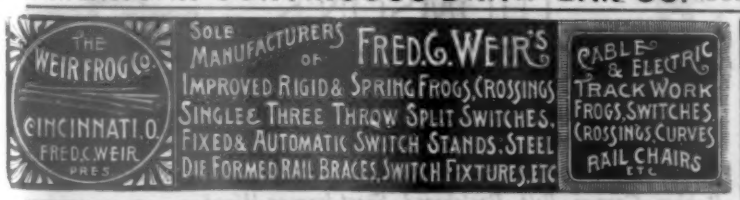

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Lidgerwood Mfg. Co., 96 Liberty St., N.Y.
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Hollow Stay Bolt Iron
Falls Hollow Stay Bolt Co., Cuyahoga Falls, O.
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Joseph F. McCoy Co., 26 Warren St., N.Y.
Watson & Stillman, 210 E. 43d St., N. Y.
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Union Iron Works, San Francisco.
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Nathan Mfg. Co., 94 Liberty street, N. Y.
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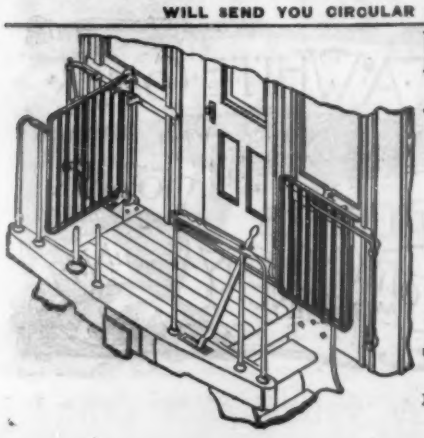

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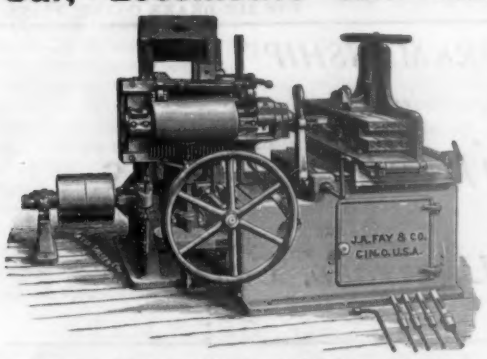

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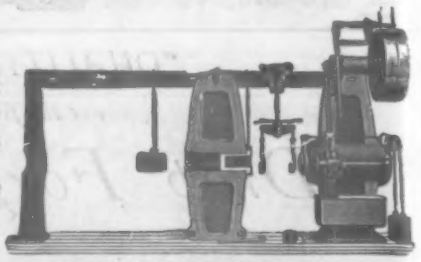
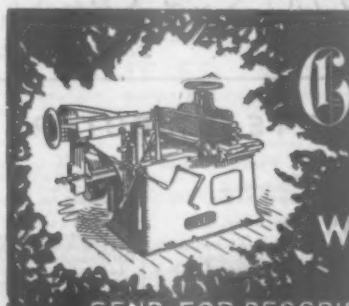


Greenlee Bros. & Co.



SPECIAL WOOD WORKING MACHINERY.

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AUTOMATIC CAR MORTISERS, AND FOUR SPINDLE CAR GAINER BORING MACHINE. DOUBLE CUT-OFF MACHINE

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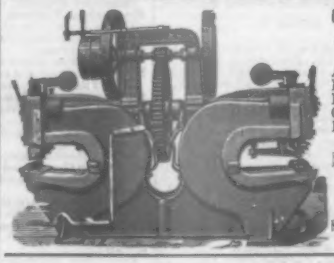

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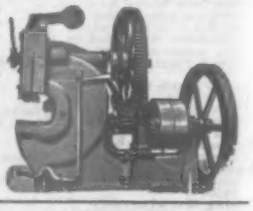

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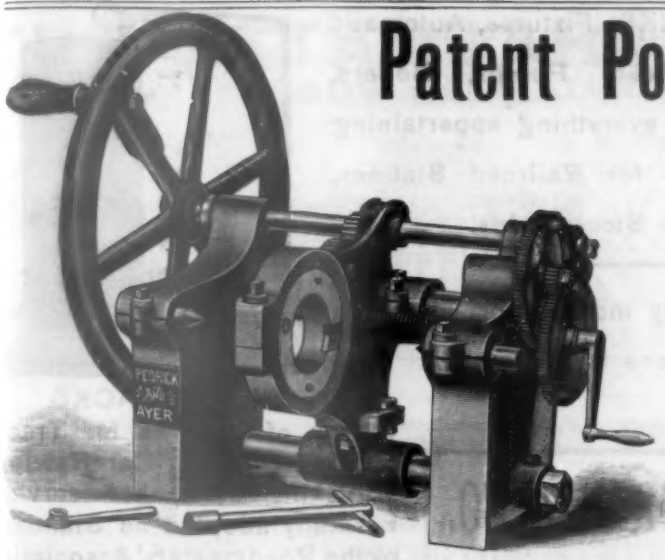

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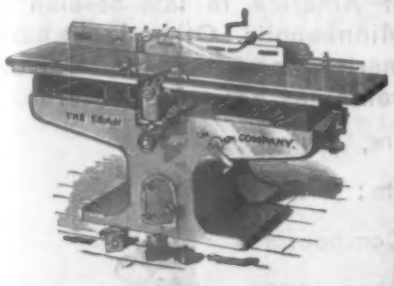

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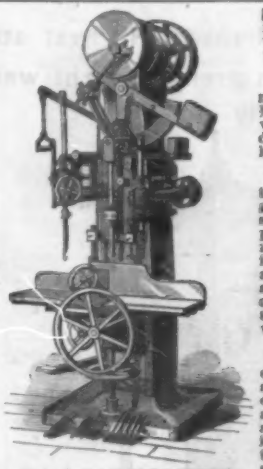

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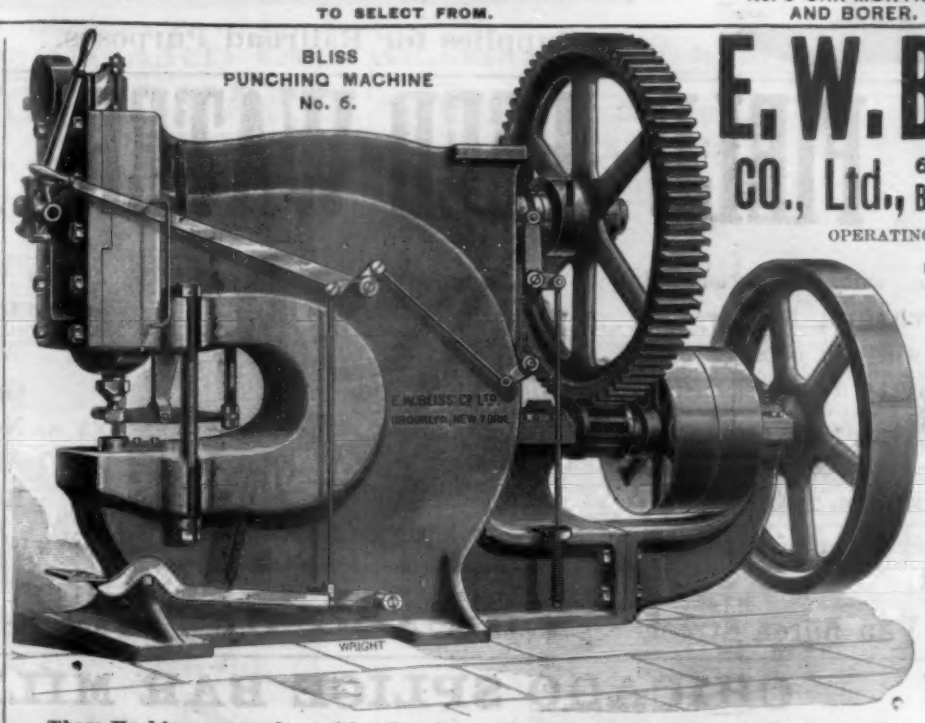

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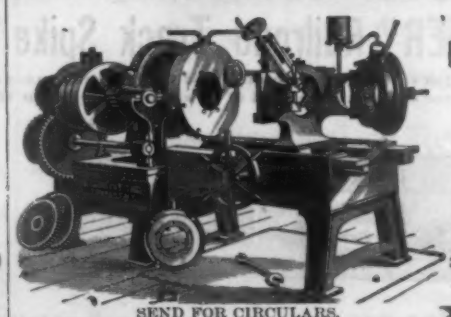

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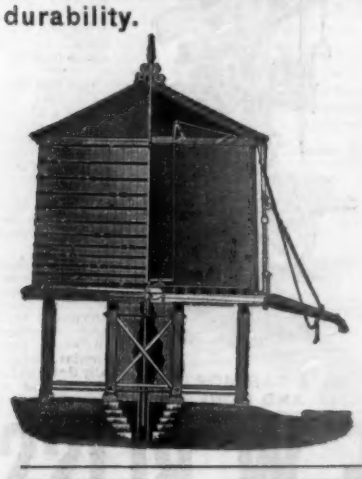

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This device will not successfully handle **all waters,** but there are **none** that it will not improve. In a **large majority** it will demonstrate great economy.

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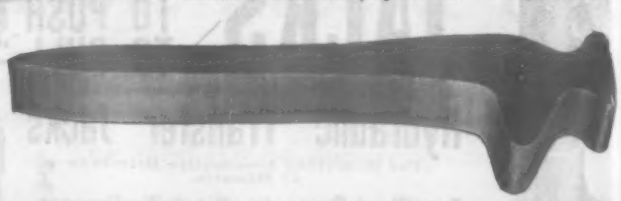
Fourteen years' unexampled success has demonstrated the fact that under all varieties of Railroad Service they will prevent "low joints," battered rail ends, and in a remarkable degree withstand the test of breakage. More than 10,000,000 Bars in use on 160 different Railroads, equivalent to 14,340 miles of track.



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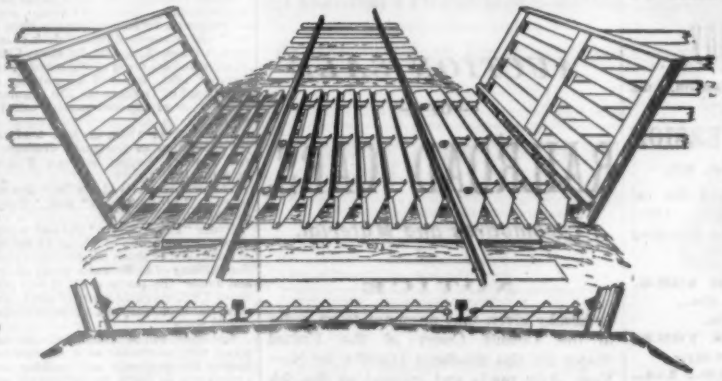

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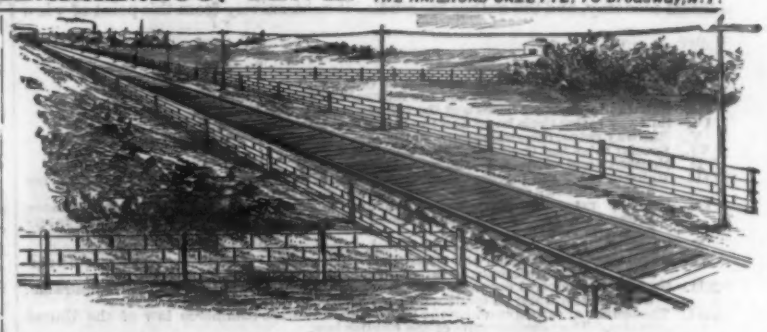

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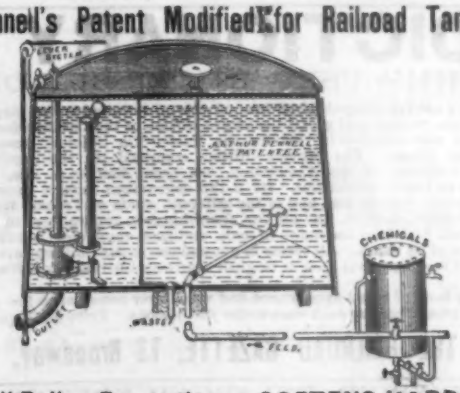
Pennell's Patent Modified for Railroad Tanks.



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The revised edition of 1885 is doubled in size and contains nearly three times as many engravings as were in the first edition. It has 2,188 engravings, including exact drawings of American Cars of every description, and of the different kinds of Trucks, Wheels, Brakes, Couplings, Seats, Lamps, Heaters, and all Car Furnishings in general use, in the minutest detail. All the detail drawings are made to scale, and each engraving is briefly described under the definition of its name. All terms in general use in Car-Building are defined, and a vocabulary of the leading terms used in English Railway Carriage and Wagon Construction is added. Price, $3.00.

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STOCKS, BONDS AND LOANS,
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FINANCIAL.

Atchison, Topeka & Santa Fe Railroad Company,

P. O. Box 346. No. 95 Milk Street, Boston, Aug. 23, 1892.

INCOME BOND CONVERSION

UNDER CIRCULAR No. 68.

Income Bonds will be received for exchange into Second Mortgage Bonds, Class A, until October 1, 1892, by the following appointed agencies:

UNION TRUST CO. OF NEW YORK
At Office of Atchison Co.,
95 Milk St., Boston.
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80 Broadway, N. Y. City.
BARING BROTHERS & CO., Ltd.,
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Income Bond Scrip of any class will be received for exchange, the same as the bonds, in amounts not less than $100, and in even hundreds or thousands.

ORAL AND WRITTEN INQUIRIES concerning this Exchange and applications for Circulars and blanks for use thereunder can be made of any of above agencies and of J. W. REINHART, VICE-PRESIDENT ATCHISON COMPANY, 95 MILK ST., BOSTON. By order of the Board of Directors.

GEORGE C. MAGOUN, *Chairman.*
J. W. REINHART, *Vice-President.*

UNITED STATES ROLLING STOCK CO.

AUCTION SALE

—OF—

RAILROAD CARS,

Locomotives and Material.

NOTICE

Is hereby given that pursuant to an order of the Circuit Court of the United States for the Southern District of New York, duly made and entered on the 6th day of July, 1892, in a cause therein pending between Henry D. Laughlin and others, complainants, and the United States Rolling Stock Company, defendant, and to orders conformatory thereof duly made and entered in the Court of Common Pleas for Champaign County, Ohio, on the 2d day of August, 1892, and in the Circuit Court of the United States for the Northern District of Alabama, on the 12th day of August, 1892, I, the undersigned, William C. Lane, Receiver of the property, assets and effects of The United States Rolling Stock Company, will sell at public auction for cash on the 26th day of September, 1892, at 10 o'clock A. M., at the works of the United States Rolling Stock Company, at New Decatur, Alabama, the following described rolling stock and material: 50 drop bottom coal cars, 3 coal cars, 28 refrigerator cars, 5 flat cars, 3 box cars, 1 locomotive, 897 new wheels, 23,400 lbs. scrap wheels, 62,400 lbs. axles, 193 automatic couplers, 77,837 lbs. bolts, nuts, etc., 90,000 square head bolts, 1,156,475 lbs. bar iron, forgings, castings, scrap, 60 tons coal, 842,214 ft. lumber, 3,777 gals. painters' material, 14,050 lbs. painters' material, 2,091 gals. oil, 15,992 brick, 298 ft. piping, 463 pieces sewer pipe, 4,585 ft. belting.

Also a large amount of general material used in the construction of cars, maintenance of machinery, etc.; also an assortment of office furniture.

And on the 27th day of September, 1892, at 12 o'clock noon, at the works of The United States Rolling Stock Co., at Anniston, Alabama, the following described rolling stock and material: 123 box cars, 88 flat cars, 15 gondola cars, 9 refrigerator cars, 1 locomotive, 5,157 car wheels, 411 automatic couplers, 977,851 lbs. axles, 88,151 lbs. bolts, rivets, nuts, keys, etc., 5,072,846 lbs. bar iron, pig iron, forge iron, castings, 89,730 lbs. steel bars, rails, etc., 1,245,757 lbs. scrap (forgings, cast, wrought, etc.), 861,120 lbs. coal, coke, etc., 512,730 ft. lumber, 4,870 gals. painters' material, 2,840 lbs. painters' material.

Also a large amount of general material and supplies used in construction of cars, maintenance of machinery, etc.; also an assortment of office furniture.

And on the 29th day of September, 1892, at 12 o'clock, noon, at the works of The United States Rolling Stock Co., at Ball Play, Alabama, the following described rolling stock and material: 2 flat cars, 1 locomotive, 5,850 ft. lumber, 110 second-hand steel rails; also a small amount of sundries.

And on the first day of October, 1892, at 10 o'clock A. M. at the works of The United States Rolling Stock Co., at Urbana, Ohio, the following described rolling stock and material: 20 box cars, 10 stock cars, 10 flat cars, 1 gondola car, 1 locomotive, 487 car wheels, 92 axles, 65,058 lbs. steel bar and sheet iron, 3,452 pieces forgings, 55,537 lbs. scrap forgings, 61,973 lbs. castings, 94,000 lbs. scrap, (cast, wrought, etc.), 91 tons coal, coke, etc., 163,808 ft. lumber, 782 gals. painters' material, 6,901 lbs. painters' material, 366 gals. oil, 154 ft. belting.

Also a large amount of general material and supplies used in the construction of cars, maintenance of machinery, etc.; also an assortment of office furniture.

A detailed list of the property to be sold will be furnished at the time and place of sale; and may also be obtained before that time upon application to the Receiver at his office, No. 45 Broadway, in the City of New York.

PROPOSALS.

SANITARY DISTRICT OF CHICAGO.

TO CONTRACTORS.

Sealed proposals addressed to the Board of Trustees of the Sanitary District of Chicago, and indorsed:

"Proposals for Excavating the Main Drainage Channel" will be received by the clerk of said Sanitary district at Room H, Rialto Building, Chicago, Ill., until 12 M. (standard time) of Wednesday, the 19th day of October, 1892, and will be publicly opened by the said Board of Trustees at the regular meeting held that day, or at a special meeting called for that purpose.

The work for which the said tenders are invited is the excavation of the main drainage channel for the said sanitary district between Willow Springs and Summit, Ill.

Bids will be received on two propositions, designated as "Proposition 1" and "Proposition 2," respectively.

Under "Proposition 1" the said work will consist in all of the excavation of about 11,400,000 cubic yards of earth, and of about 500,000 cubic yards of rock, and the building of 40,000 cubic yards of dry rubble walls, and under "Proposition 2" it will consist in all of about 7,925,000 cubic yards of earth, of about 850,000 cubic yards of rock, and of 40,000 cubic yards of dry rubble walls.

Said work will be divided into six sections, each of which will be treated as a separate contract in canvassing the proposals and making awards. As all awards will be made by individual sections as provided in the specifications and forms of proposals to be furnished bidders, each bidder must make prices for each section, separate and distinct from every other. The lumping of prices in any bid will render such bid informal, and will cause its rejection by the said Board of Trustees.

As the question of which proposition will be acted upon will not be determined by the Board of Trustees until after the time set for receiving proposals, the bidder is allowed to make two alternative tenders, based upon the terms of the specifications for each of the two propositions respectively.

Each proposal must be accompanied by a certified check, or cash to an amount equal to $3,000 multiplied by the number of sections bid upon; provided that the said check or cash shall entitle the bidder to make tender under one or both of the said propositions.

All certified checks must be drawn on some responsible bank doing business in the city of Chicago, and be made payable to the order of the Clerk of the Sanitary District of Chicago. Said amount of $3,000 for each section will be held by the Sanitary District until all of said proposals have been canvassed and contracts awarded and signed, the return of said check or cash being conditioned upon any bidder to whom an award of any portion of said work may be made appearing within ten days after notice of such award being given, with bondsmen, and executing a contract with the Sanitary District for the section or sections of said work so awarded, and giving a bond satisfactory to the said Board of Trustees for the fulfillment of the same in the amount of $75,000 for each section of work awarded him.

All proposals must be made upon blank forms furnished by the Sanitary District, and must give the price for each separate item of work.

The bids will be compared on the basis of the engineer's approximate estimate of quantities, which will be furnished with copies of the specifications.

No proposal will be considered unless the party making it shall furnish evidence satisfactory to the Board of Trustees of his ability to do the work, and that he has the necessary pecuniary resources to fulfill the conditions of the contract, provided such contract shall be awarded him.

Bidders are required to state in their proposals their individual names and places of residence in full.

Specifications and plans may be seen at the office of the Chief Engineer, Room D, Rialto Building, Chicago, Ill.

The said Board of Trustees reserves the right to reject any and all bids.

THE SANITARY DISTRICT OF CHICAGO,
By FRANK WENTER,
President of its Board of Trustees.
Attest: THOMAS F. JUDGE, Clerk.
CHICAGO, Ill., Aug. 20, 1892.

CHEAP HOMES FOR MILLIONS.

In order to meet the demands which come from every quarter of the North and East for cheap rates, in order to enable the farmer, the emigrant and the capitalist to visit the Southwest and particularly TEXAS, the MISSOURI, KANSAS & TEXAS RAILWAY have determined to sell tickets on Aug. 30 to all points on its main line in Missouri, Kansas and the Indian Territory, south of Clinton, Mo., to all points in Texas, at the extremely low rate of ONE FARE FOR THE ROUND TRIP, good to return 20 days from date of sale. Now is your opportunity. Go and see for yourself.

For further information as to rates, routes, maps, time tables, etc., call on or address,

WALTER G. GRAHAM,
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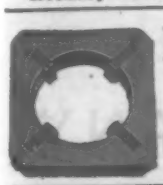

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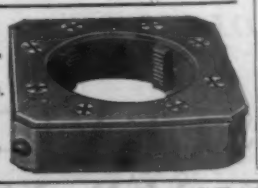

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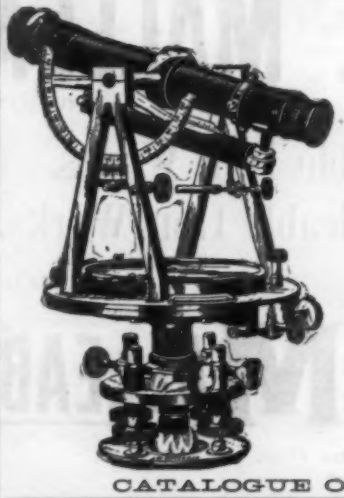

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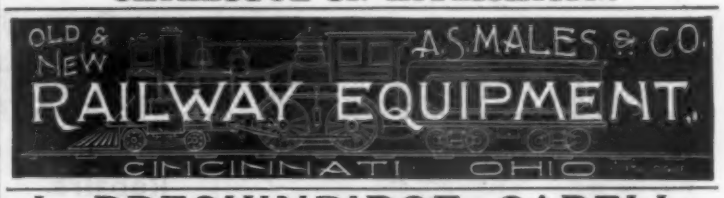

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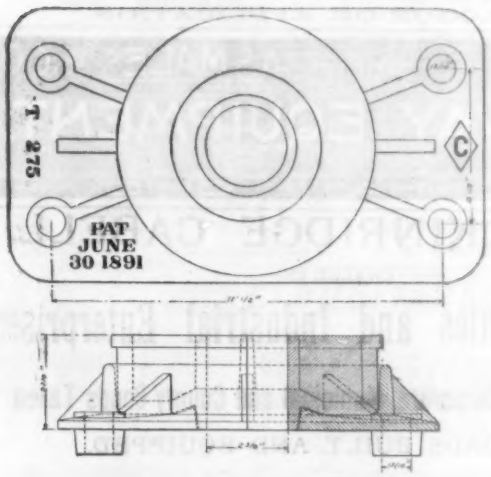

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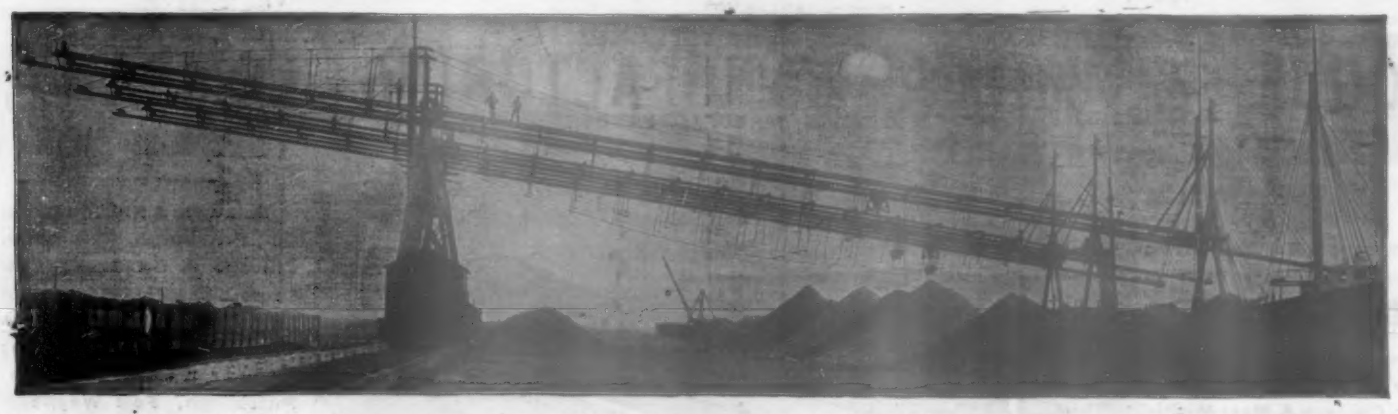

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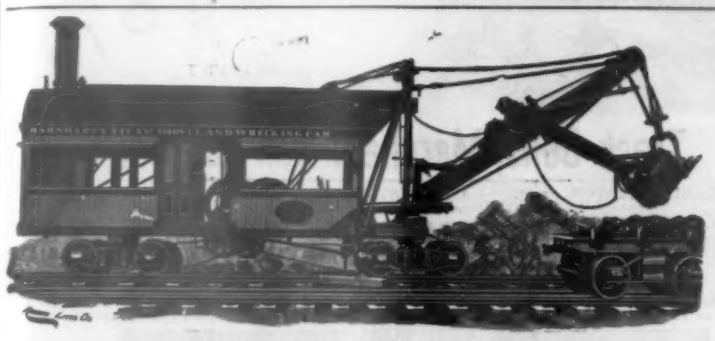

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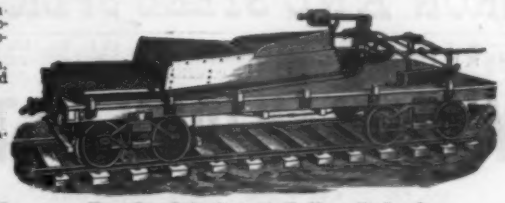

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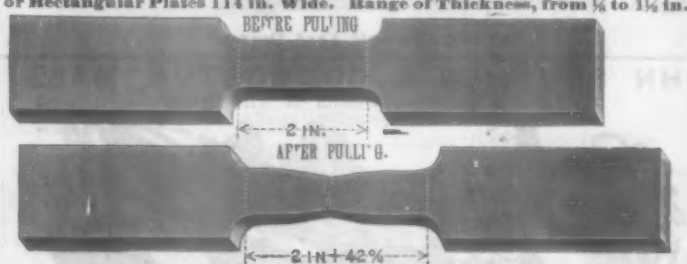

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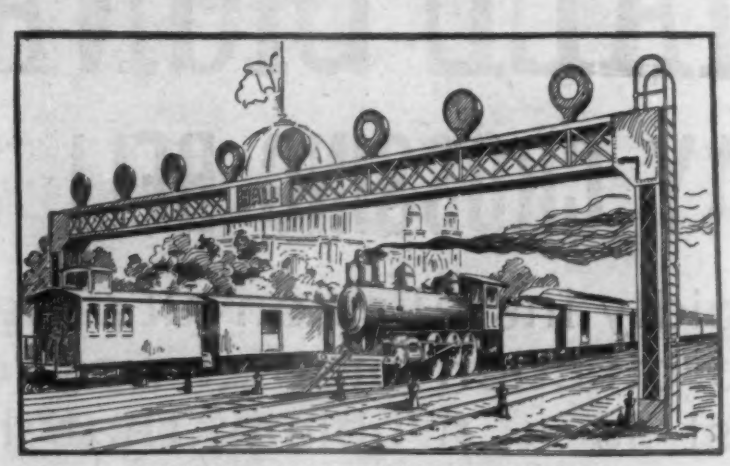

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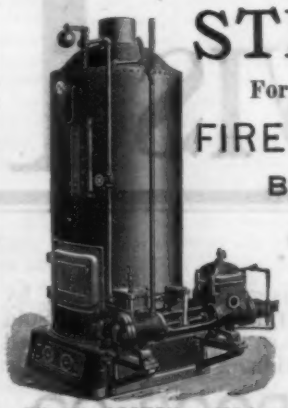

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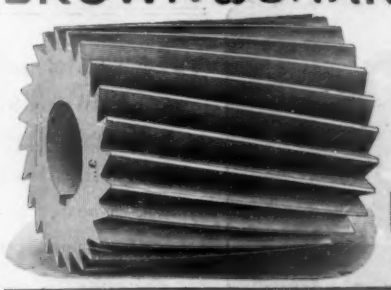
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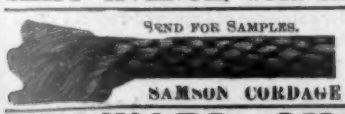
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RAILROAD GAZETTE

FRIDAY, SEPT. 9.

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Contributions.

Toughened Steel Rails.

NEW YORK, Sept 5, 1892.

TO THE EDITOR OF THE RAILROAD GAZETTE:

The analysis of the "toughened" steel rails by Dr. Maunsel White, published in your issue of the 2d inst., is of interest as applying to a class of rail which has given extraordinary service, and whose production has ceased. For the purpose of rendering more complete the comparison between these rails and the 75-lb. rail, cited as "representing the latest ideas and promising the best results," it is regretted that the chemical analysis of the latter was not also published; and since the percentage of carbon in the toughened specimens varied nearly 100 per cent., that more of these analyses could not have been made.

The deduction of Dr. White, that the long life of these rails is due to cold rolling, under light traffic, rather than to the toughening process, does not seem to be verified by the results of other rails under similar traffic. The template sent you showed a wear of only one-sixteenth of an inch after a service of 20 years, but as the toughening process probably affected the skin of the rails only, they would have deteriorated rapidly after it was worn through.

It is not clear why the test specimens cut should be influenced by "toughening" any more than by the cold rolling, since neither process reached the material in the specimen, HENRY B. SEAMAN.

The British Board of Trade and Railroad Accidents.

TO THE EDITOR OF THE RAILROAD GAZETTE:

Your correspondent "Superintendent" credits me with opinions which I by no means hold. (See *Railroad Gazette* Aug. 5, p. 573.) I have often protested against the (as I think) exaggerated demands of our Board of Trade Inspectors, but I feel sure I have never denied their thorough and exhaustive knowledge of the subject with which they deal, and, what is much more to the point, never heard the operating officers of our great lines doing it either. It is no question of amateurs meddling with what they do not understand. On the contrary, if the British public is prepared to demand, as it at present seems to be, the maximum attainable safety of travel and to pay for it, *coûte que coûte*, it cannot have better advisers than the Board of Trade Inspectors. My point has always been that the British public is not aware how high a price in diminished service and arrested development of poor districts it pays for the extravagant standard of safety which it has set up.

Into the general question whether the government officials ought to interfere in the technical details of working I do not propose to enter—as the interference is certain to come the question has only an academic interest; but this one word I will add, that if any English railway man were in search of instances to prove how unjustifiable and unnecessary such interference was he would not be likely to bring forward the case of the Highland Company as telling in his favor.

W. M. ACWORTH.

Passenger Fares to the World's Fair.

NEW YORK, Sept. 3, 1892.

TO THE EDITOR OF THE RAILROAD GAZETTE:

It seemed to me while in Europe this summer that many engineers and others would be deterred from coming to Chicago next year through apprehension of the cost of railroad fares for the 2,000 miles of necessary travel in this country.

They measure the expense of transportation over such a distance by European standards, and are so fully convinced that our fiscal policy results in increased cost that my prediction that the round trip fare from New York would not exceed $30 was received with universal incredulity.

Can I suggest through you that the managers of the Fair could do European engineers a decided kindness by announcing the maximum fares that will be charged between Chicago and New York, at as early a date as is possible." EDWARD P. NORTH.

[Mr. North's estimate is probably a very safe one. The regular fare by the best roads is $20 each way, and the sleeping car fare $5 each way. There is little doubt that the railroad fare will be reduced one-half, but the berth fare will probably be maintained. This is on trains going through in about 28 hours. The only doubt of any consequence is whether the best lines, in order to compete with the weaker roads, which are likely to carry passengers out and back (in sleeping cars a little less elegant than the highest Pullman standard) for $20, including a berth, may not reduce the fare more than 50 per cent. The weaker lines will make slower time, but, as every one knows, 35 hours—two nights and a day—is a reasonable time for this trip. Carrying passengers at this speed, in train loads, all the roads will probably be glad to accept less than a cent a mile as long as they have any empty cars. —EDITOR RAILROAD GAZETTE.]

The Goose and the Golden Egg.

TO THE EDITOR OF THE RAILROAD GAZETTE:

The condition of things to which you refer in your remarks on "Cast Iron Wheels" is exactly what troubles the goose [see *Railroad Gazette* Aug. 19, pp. 609 and 618]. When you state "that within the last two years the prices of pig iron have fallen so much that the wheel makers' business to-day may yield a little more profit than it did three years ago," you state what may be perfectly true so far as some wheel makers are concerned, but it is not the case with those who make the best wheels. The necessity of finding a market for the best pig iron has indeed somewhat reduced its selling price, but it is only another case of killing the goose instead of fattening him, and it is only a question of time when the best furnaces must close as well as the best wheel foundries. As long as there are wheel makers willing to make wheels out of iron which costs, as you state "from $12.50 to $26," or an average of $19¼ per ton, and as long as railroad companies are willing to buy such wheels simply because they can be made to stand the tests prescribed in the specifications the encouragement to make the highest grades of pig iron and of wheels will be well nigh taken away.

The best grades of iron, such, and such only, as the best wheel makers are willing to use, cost, even at the present depressed prices, from $20 to $30, or an average of $25 per ton, and it is easy to see that wheels made out of such material cannot be sold at a reasonable business profit for anything like "1¼c. per lb." They are not made with reference to specifications, tests or guarantees. If there were no such things as specifications or guarantees the makers of such wheels would furnish the same wheels they are furnishing now, and, as they have done, would constantly aim to furnish better, and all experience has shown that such wheels, even at prices in fair relation to their higher cost of manufacture, are found to be, per unit of service, the cheapest wheels in the market.

Without any elaborate or expensive system of mileage accounts, and without any guaranteed mileage by the maker, every railroad company can easily ascertain who are the makers of such wheels, just as easily as the same facts can be ascertained in any other branch of business. In former times, when the Superintendent of Motive Power or the Master Mechanic bought railroad supplies there was no difficulty in ascertaining it, and makers received the patronage of the roads because of the quality of their work, and not altogether because of its price. Now, however, such purchases are made by another department which looks mainly at the price. It thus happens that the poorest fixes the price of the best. When the best makers bid for contracts and base their price on a reasonable relation to their cost of production, they are simply told that wheels which are guaranteed to stand the tests are offered at far lower figures, and they must accept the same or lose the business. This is no uncommon occurrence.

There is very much ready made clothing in the market which is very cheap. It will cover and protect the body, and for a time will be reasonably serviceable. But every one knows it is not the most economical clothing, and no respectable purchasing agent buys it for his own use or that of his family any longer than he can help. As soon as he can he buys better and saves money, and he has no difficulty in finding out where he can buy better. Why should he not buy wheels for the great company to whom he ministers, on the same principles that governs when he buys coats and boots? INQUIRER.

Some Disputed Points in Bridge Designing.

KANSAS CITY, Aug. 11, 1892.

TO THE EDITOR OF THE RAILROAD GAZETTE:

It has been my intention for some time to send you a communication on the subject of "Some Disputed Points in Railroad Bridge Designing," and to thank you for your editorial of May 20 and for your kind promise of co-operation in the work which I have laid out for myself in my résumé of the discussions; but almost continuous absence from my office and work under high pressure have prevented me from doing so hitherto. I will first discuss a few points that you have touched upon in your editorial, then proceed to take up a few other matters.

Equivalent Uniform Loads vs. a Constant Uniform Load per Lineal Foot Headed by a Single Concentrated Load.—I am sorry that you disagree with me on this subject, for your opinion will have great weight with railroad engineers; and these are the gentlemen whom I wish to influence in order to effect a change in the style of loads specified for bridges. If by united effort we succeed in effecting said change (and the necessity for this is made evident by the discussion of my paper) ought we not to decide to adopt that style of loading which will involve the least amount of work for bridge engineers, and which will give results agreeing most closely with those caused by certain assumed typical concentrated loads that may be termed standard? Therefore I am going to ask you to let me try to convince you that the equivalent uniform load system is in both particulars much better than that of the single uniform load headed by a single concentration.

1. After the equivalent uniform loads for certain standard train loads that have been adopted by the majority of railroad and bridge engineers have been computed and plotted on diagrams, there is no method of loading which will facilitate calculation so greatly as this. The single uniform load without its concentration *involves exactly the same calculations as does the equivalent uniform load*, and the single concentration involves almost as much more; consequently in designing a bridge, the amount of labor involved by the single uniform load with its single concentration is nearly twice as great as that involved by the equivalent uniform load.

2. There is no importance to be attached to the remark made by so many that it is more trouble to calculate the equivalents than it is to find the stresses by the concentrated load method, for I have promised to prepare diagrams of all the equivalents for any series of standard train loads adopted.

3. In the case of Cooper's Class A loading (and, in all probability, in all other cases of similar standard train loads) the extreme variations of stresses found by the single uniform and single concentrated load from those found by the theoretically correct method of concentrated wheel loads are fully twice as great as the corresponding extreme variations for the equivalent uniform loads. The variations in case of Cooper's Class A for the single uniform and single concentrated load are as great as five per cent. for excess and five per cent. for deficiency. These are too large in case that it be desirable to have the results of the approximate calculations agree fairly with those of the theoretically exact ones. If satisfactory results are to be obtained by this method it would be necessary to vary the amount of the concentration for different span lengths, in which case the only favorable feature of the method, viz., invariability of loading, vanishes.

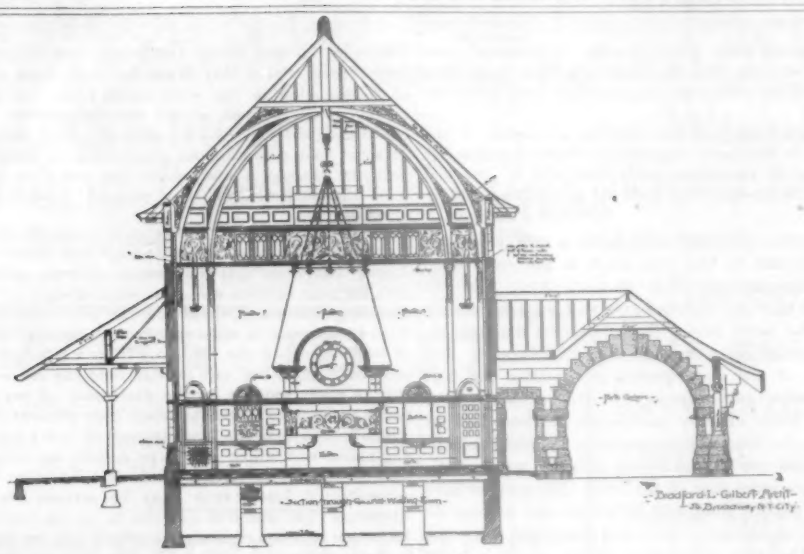
5. It is to be remembered that for all plate girder spans (which are now limited in length to about 100 ft.) the equivalent uniform load *gives exact results*, and that after a truss span is designed by the equivalent uniform load method there will hardly ever be found in the sections of the members variations from exactness, caused by the method, as high as one per cent.

The Proper Live Loads for Modern Bridge Specifications.—It is my intention to adopt your suggestion that I add two standard train loads for mountain lines to my proposed standards. These ought to make the series so complete that any railroad engineer desiring to adopt a standard live load for the bridges on his line could find therein almost exactly the load he desires, or one near enough thereto for all practical purposes.

Reaming.—On account of the objections to the non reaming of rivet holes in steel still held by many prominent engineers, it appears to me advisable to adhere to the reaming process until an exhaustive series of experiments prove that there is no necessity therefor. My opinion on this subject was really second-hand, having been formed by conversations with certain engineers of experience in the manufacture of steel. Perhaps these gentlemen are a little premature in their conclusions, or perhaps they were unwittingly influenced by convenience in manufacture. At any rate, until we have something more reliable to go upon than mere opinion, I consider it safer to adhere to the old practice of specifying reamed holes and have called for them in some recent specifications for steel bridge work.

Clear Roadway.—My opinion concerning this important point was formed partially by observation and partially by numerous conversations with railroad engineers in charge of bridges. My estimate of a saving of 90 per cent. of bridge accidents caused by derailments was made in the latter manner, and principally by discussion with one of the most prominent railroad engineers of the South, whose name I do not feel at liberty to mention.

Further Discussions of the Paper.—Although the discussion of this paper has been unusually extensive and varied, nevertheless I consider that there is still a good deal to be said, and hence would urge most earnestly



Laconia Passenger Station.

Cross-section through main hall.

that those bridge engineers who have hitherto held aloof from the discussion now take it up and give the profession their views upon the most important of the points discussed; also that railroad engineers contribute to the discussion their opinions concerning the points that they from their practical experience are best fitted to decide, such, for instance, as the widening of clear roadways, limiting length for plate girder spans, pin-connected vs. riveted structures, suspended floor beams, rigid vs. adjustable lateral bracing, adjustable counters, spacing of stringers, style of floor-system proper, re-railing apparatus, weaknesses in existing plate and lattice girders, riveting stringers to floor beams, etc., etc. All discussions can be contributed to the American Society of Civil Engineers for publication in its *Transactions*.

Owing to the high pressure under which I had to work when preparing my résumé of the discussions, I, much to my regret, misinterpreted Prof. J. B. Johnson's investigation of the extreme fibre stress in eye-bars, and thereby did that gentleman an injustice. Since then I have found time to look further into the matter, and have checked the entire demonstration and the table, finding both to be correct. Professor Johnson's mathematical treatment of the problem is both elegant and conclusive. The deduction to be made therefrom is not what some designers might assume, viz., that in view of the fact that in no practical case is the bending stress on the bar of any great magnitude, it is legitimate to make long bars as shallow as one pleases; but that those designers who have in the past transgressed the rules of good proportioning for the sake of economy of material, may rest easy in mind, comforting themselves with the thought that, although their designing was not conducive to rigidity of structure, nevertheless it did not involve an element of danger.

We can conclude from Professor Johnson's valuable investigation that, as far as extreme fibre stress in eye-bars is concerned, the ratio of length of bar to depth is of no practical importance. At the same time, for the sake of preventing undue vibration in the structure and for other practical reasons, the limits given in the table in my paper should not ordinarily be exceeded.

As soon as professional duties will permit me I shall send a circular letter to the chief engineers and bridge engineers of railroads, as given in Poor's Manual, to all bridge specialists on the list of the American Society of Civil Engineers, and to all professors of civil engineering who have shown an interest in the subject of bridge designing. Should I omit any one it will be by accident, and I herewith apologize beforehand for such omission. I hope that the gentlemen to whom this letter will be sent will receive and answer it in the spirit in which it will be written, and that they will believe that I am influenced solely by an earnest desire to advance the interests of our profession. Some of them may think that in requesting a consensus of opinion by circular letter I am taking a good deal upon myself. To such I would reply that I see no other way to accomplish my purpose

J. A. L. WADDELL.

Anthracite Locomotive with Large Firebox.

Before the lease of the Lehigh Valley to the Reading was made designs had been prepared for an anthracite-burning passenger engine, with large firebox and large total heating surface. This engine was built at the South Easton shops of the Lehigh Valley and was nearly completed before the lease took effect. It has lately been running the Royal Blue Line trains between Philadelphia and New York, which consist of five heavy Pullman cars. The time has been made by the engine ever since it has been on, and it has made several records above 80 miles an hour. For the following particulars of the locomotive and its performance, we are indebted to Mr. J. I. Kinsey, Division Master Mechanic at South Easton. Of course our readers do not need to be told that Mr. Kinsey has been for years the Lehigh Valley Master Mechanic at that place.

This locomotive, No. 615, was built for the purpose of demonstrating the economy of a large firebox and heating surface for burning anthracite coal. The engines built for the Philadelphia & Reading for running the fast trains were built after the patent of Mr. John E. Wootten. The boilers of these are built with a combustion chamber, and a brick bridge wall is built up in the firebox. That bridge wall is for the purpose of keeping the grate bars as nearly on a line with the flues as possible, so as not to raise the boiler up too high from the rail. This engine, No. 615, is built without the bridge wall or the combustion chamber, which makes the flue sheets perfectly straight. As a matter of course the boiler had to be raised that much higher in order to drop the grate bars down so as to get sufficient depth of the firebox, which makes the centre of the boiler 8 ft. 10 in. from the top of the rail; otherwise the engine does not differ from other locomotives excepting in some few particulars.

The advantages of this plain boiler over the one with a combustion chamber are that where you have a bridge wall and combustion chamber there is a space left for the dirt to collect, and when the dirt collects in that space, it naturally stops up the flues and as a matter of course you lose the effect of that heating surface. After the flues become so stopped up from the cinder and stuff that passes over the bridge wall it is necessary to haul the fire out of the engine in order to clean out the combustion chamber. Frequently the bridge wall gives out and has to be built up again. Whenever you haul the fire from a locomotive coal is wasted and it requires about half a cord of wood to fire up. With the firebox made as in No. 615 there is no occasion to haul the fire, as the flues do not clog and there is the same effective heating surface all the time; it makes the engine a freer steamer. This engine has double nozzles, 3⅛ in. in diameter each, so that it is very easy on the fire.

Dimensions of Anthracite Coal Burning Engine, built by the Lehigh Valley Railroad, at South Easton shops, 1892, J. I. Kinsey, Master Mechanic.

Cylinders	19 × 26 in.	Weight; working order	108,640 lbs.
Gauge	4 ft. 8½ in.	Weight; on drivers	77,616 "
Driving wheel base	7 ft.	" on truck	31,024 "
Total	21 ft. ¾ in.	Diam. of boiler	60 in.
		" " driving wheels	68 in.

Total heating surface	1,575.92 sq. ft.
Grate area	63.61 sq. ft.
No. of 2-in. flues	253
Distance from top of rail to centre of boiler	8 ft. 10 in.

Concord & Montreal Passenger Station, Laconia, N.H.

The engraving published herewith gives a view of a passenger station completed last month for the Concord & Montreal, at Laconia, N. H., an enterprising town of about 7,000 inhabitants.

The general style of architecture of the building is termed by the designer modern English, with a dash of Romanesque treatment. The exterior of the building is of Milford (Mass.) dark pink, speckled granite, and the trimmings are of dark red freestone from Longmeadow, Mass. The general waiting room is 40 × 40 ft., and is open to the roof. There are a ladies' room and a smoking room at opposite ends. The toilet rooms are finished entirely in marble. The floor of the large or main room is of tile, and the walls to the height of 10 ft. are finished in quartered oak, and above that plastered and tinted in two shades. This room has a fireplace of red sandstone handsomely carved and a large marble clock. There is elegant and comfortable furniture in all the rooms. The entire building is equipped with both gas and electric lights and heated by steam.

The plans for this station were made by Bradford L. Gilbert, of 50 Broadway, New York, and its cost, exclusive of plumbing and heating apparatus, was about $28,000. The total cost of the building and surrounding improvements was $35,000.

Love Electric Conduit System.

There has been considerale discussion of late regarding the practicability of using electric conduits for street railroad service. Up to the present time the overhead trolley system has had the advantage over all competitors for electric railroad service of all kinds. In February of this year the North Chicago Street Railway Co. equipped a loop about 1¼ miles in length with the Love Electric Traction Co.'s conduit system. The work was done during the very cold weather in February and March, but notwithstanding the many discouraging in-

PASSENGER STATION AT LACONIA, N. H.—CONCORD & MONTREAL RAILROAD.

Designed by Mr. BRADFORD L. GILBERT, *New York.*

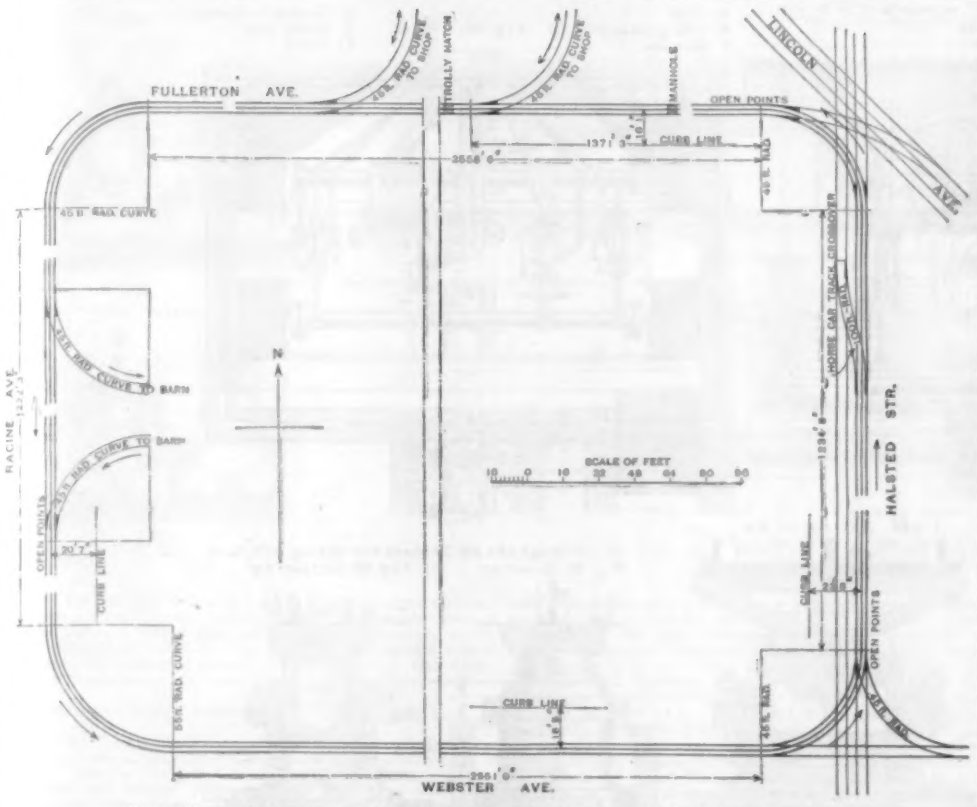


Fig. 1—North Chicago Street Railroad, Operated by the Love Electric Conduit System.

cidents attendant upon its installation the line was put into operation as soon as completed and has had practically no stoppages since it was finished. Quite a number of details were incomplete when the line was built, and at the best they were temporary expedients, but practical success was achieved in spite of this.

The construction of this conduit road is quite similar to the usual cable road. It has cast iron yokes spaced about 4 ft. apart and a cast iron conduit about 9 in. wide and 15 in. deep. The top cover of the conduit consists of rolled steel angles having a deep vertical flange on the side next to the slot. The position of these two flanges is shown in fig. 2. These flanged rails are cut into lengths of about 30 ft. each and are so constructed and laid that they can be taken up at any time, giving free access to the interior of the conduit for purposes of

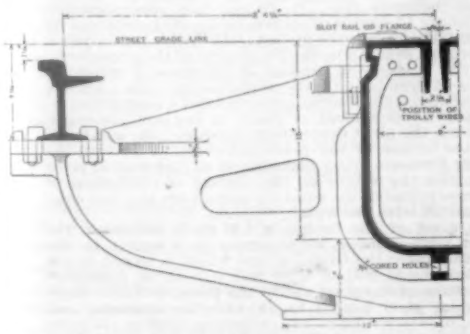


Fig. 2—Love Electric Conduit for Street Railroads—Cross-Section.

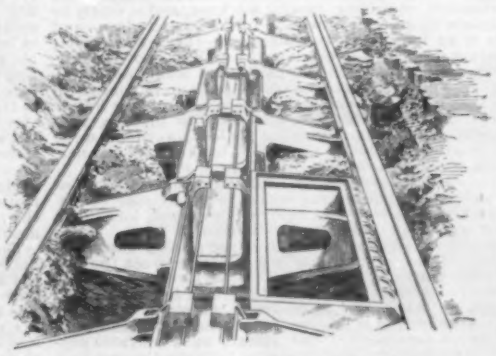


Fig. 3—The Love Electric Conduit.

repair or for the removal of dirt or other obstructions that may fall into the conduit. The slot rail is made to serve a two-fold purpose; it defines the slot and protects the copper wire conductors from outside interference. There are two copper wires about ⅝ in. diameter spaced about 6 in. apart for carrying the current. The trolley bar is a very simple device. The trolley wheels are slightly smaller than those used in overhead roads, and are so suspended from the trolley bar that they admit of all necessary vertical and horizontal motions due to the irregularities of the line and in passing curves. The trolley bar is so constructed that it can be readily detached from the car or replaced.

During the heavy rain storms in Chicago in the months of May and June this road was severely taxed, as in some places the streets were covered to a depth of three or four inches with water, filling the conduits. Notwithstanding the presence of water in the conduits, the running of the road was not interfered with. This road was put in as an experiment, but it has been so successful that the North Chicago Street Railway Co. has bought it, being well satisfied with the service rendered. Nineteen miles of this electric conduit system is negotiated for in Washington and Baltimore this year, and it is expected to have the lines in running order within six months.

The plant in Chicago for generating the current consists of one Edison dynamo, and a high speed Ideal" engine. The two motor cars are equipped with Westinghouse motors. These two cars supersede about 110 horses, 60 being on the line constantly. The per diem cost for fuel and help at the power station is said to be very low. The repairs to trolley and other details have been reasonable so far.

Piling vs. Mudsills for Bridge Foundations.*

BY E. L. CANTINE.

In rock formation or yielding soil this discussion is not a pertinent one, for in the first case mudsills alone can be used, while in the second, piling only would be considered, but as the mean of these natural conditions is approached the chance for an argument increases.

The subject will be open for discussion under the following heads:

First cost, stability, length of life, maintenance and renewals, conclusions.

First Cost.—A fair average price for piling would be 35 (30 to 35) cents a foot for amount left in struc ture, contractor to furnish piling, and $25 per 1,000 ft. B. M. for timber in structure, contractor furnishing lumber. These are average prices in the west. As a rule five mudsills 12 x 12 by 5 ft., will be equivalent to one pile support in bridge. Five mudsills by 12 x 12 5 ft., equals 300 ft., B. M., which at $25 per M. costs $7.50, and with 55 cents allowance for excavation makes mudsills cost $8.05. This amount will pay for 23 ft. of piling left in structure, at 35 cents per lineal foot. As a rule, where ground is such that piling will drive that distance, mudsills would not be used, so that with exceptional cases, first cost of piling is as cheap, or cheaper than mudsills.

Stability.—Let this be considered under three heads, to wit: 1. All foundations between the slope of banks. 2. On slope of embankments; and 3. End of banks.

1. Between slopes at either end of bridge. Mudsills, if placed right, are on solid ground (although I have heard of a case where banks were built up for mudsills to rest upon). This is as favorable a condition as they have, and not one in a hundred thus favorably situated, but has to be shimmed up within six months after construction in order to keep bridge in surface. Not only that, but every winter the frost will heave the mudsills, and continue to heave them, requiring constant attention. None of these objections are true with piling. One objection against piles often urged is, that you do not know whether they are properly driven, and you cannot depend upon inspection, while if mudsills settle, you know that no disastrous results will follow. True, possibly, but I consider this no argument against piling, but rather an argument to pay pile inspectors a little larger salary and obtain men upon whom you can rely both as to their judgment and integrity.

2. Foundations in slope embankments: There I can see but one thing to do, that is to use piling, rock bottom or earth, as banks settle 1 to 8 ft. the first year, according to season in which built or kind of material used. The past year in the Cœur d'Alene district of Idaho, some banks made the previous season went down nearly 9 ft., having been built on heavy slopes, and during the winter the mudsills and bridges will follow the bank as long as it settles, for three years at any rate. Piling properly braced by slope braces carried down banks to bottom piling, will stand the grief all right. Wherever there are heavy banks at end of bridges, the bridge should be planned so that a continuous girt runs clear across bridge, and continuous with slope bracing carried to piles in banks, that effect of settlement of banks will be counteracted, and bents will not be pushed out of plumb. Now if mudsills are used in bottom of bridge, or in slopes, you cannot take care of the strain, and the bridge is bound to get racked—a difficult matter to remedy.

3. Foundations for end of banks: Good practice differs here. The objection to piling at this place is, that bank with track will settle, and connection with bridge soon becomes a hard jolting place for trains, and possibly causes a kink in rails. It is true that with mudsills the connection is an easier one, coming on to the solid bridge more gradually, but with a well managed road the intention is to keep this track up, and allow no depression to exist. Granting this, why not drive piling in end of bank, and let the section gang keep up track to the bridge? When mudsills are used, the bridge department raises its bridges periodically when section gang comes and raises track. The bridge crews have generally 100 to 200 miles to look after, and can not give the matter as close attention as could the section gang always on the ground. You ask why not let the section men raise the end of the bridge? They are not in it, to use a western vernacular. A section boss raises the rails with a "shim," his panacea for all evils, and lets the bridge pursue its own course. When his spikes are drawn from tie he will proceed to nail a plank on tie, spiking rail to the plank. Bridge men have to look after the bridges. Some roads use mudsills first year, and replace them with piling, driven with a track driver after banks have quit settling. Possibly this is the best practice with roads having heavy traffic, but for a railroad with light traffic, would it not be best to use piling from the start? It seems so to me. Of course the piling is assumed to be driven *clear through bank into solid ground, same as if no bank existed*, that no settling may occur. By experience I have learned it will not do to rely upon friction of new made banks, to hold piling from settlement.

Length of Life.—The Northern Pacific is now (1891-2) engaged in filling up and reconstructing bridges on its western divisions, constructed during 1881-2 and 3. Referring to Idaho division more particularly, the life of the superstructure has been ten years. The mudsills have been renewed once in that time, their life being about five years. The piling used as foundations has lasted as long as bridges, and in many of the bridges where piling was used, the piles are good for another five years. The pile foundations have outlived two sets of mudsills, lasted as long as remainder of superstructure, and in many places are yet good for several years.

From the Superintendent of Bridges of the Rocky Mountain Division I recently received the following data as to the average life of bridges upon that division: Howe truss bridges, constructed of Oregon fir, 10 to 14 years, according to location; constructed of Montana pine, 6 to 8 years; decks of pile bridges, pine, 6 to 8 years; Oregon fir, 10 to 14 years; pine piling, 4 years; fir or tamarac piles, 6 to 9 years; mudsills, 4 years. The Montana pine referred to is a species of "bull" pine.

Maintenance and Renewals.—Pile foundations require no expenditures for maintenance; on the contrary, mudsills require attention from time bridge is constructed, as weight of engine will produce settlement, which throws bridge out of surface. This settlement cannot be allowed for, as its inequality defies calculation. Every winter the frost will heave mudsills, necessitating constant care, and an annual expenditure of money. The cost of renewal depends upon method followed. If piling is renewed with double piling and a pile cap, it is more expensive than first cost, but if the original foundations are placed right, one of two courses should be pursued. Saw piling off below surface of ground (piles decay at ground line), and put in a crippled bent, using same piles, or else, if ground is favorable, have original cutoffs so low, that when renewals are made, mudsills may be substituted, leaving bottom sill of lower deck of bridge in its first position. By the first course, the pile foundation is renewed at original cost (the framing and material of crippled bent being equivalent to first cost of piling), and by the second, at same cost as that of mudsill renewals, which will as a rule be heavier than first price paid. The advantage, if any, is probably on side of piling.

Conclusions.—1. The cost of pile foundation, where mudsills can be used is, as a rule, less than that of the mudsills, but considering that piling will outlive two sets of mudsills, and the constant annual expenditure which they require, it would be economy, if necessary, to spend twice the cost of mudsill foundation plus capitalized value of annual expenditure, less annual interest of difference in cost of two foundations, and put the money in pile foundations.

2. If mudsills are to be used at all, cedar or equally durable wood should be employed in preference to pine. Also tamarac, red fir, or cedar, in preference to pine for foundations.

3. Piling is far preferable to mudsills, because it will not settle or heave.

4. Because it presents a means of support, for girts and slope braces, such that strain from settling and sliding banks can be controlled and bridge not thrown out of shape.

5. That piling in ends of banks' places work of keeping up track at end of bridge with the section crews, who are over the road every day, and reduces bridge force, which is more expensive than track laborers.

6. That piling costs nothing for maintenance, while mudsills require a constant annual expenditure.

7. Piling is cheaply renewed, while its life is twice that of mudsills.

8. Piling wherever possible should be used in preference to mudsills.

* From the Report of the Seventh Annual Meeting of the Illinois Society of Engineers and Surveyors.

Car Couplers.

Mr. A. W. Van Dorston, the inventor of the cushioned car coupler now called the "Columbia Universal," has bought all the patents previously owned by the Van Dorston Cushioned Car Coupling Equipment Co., of Philadelphia. The transaction was completed Sept. 3.

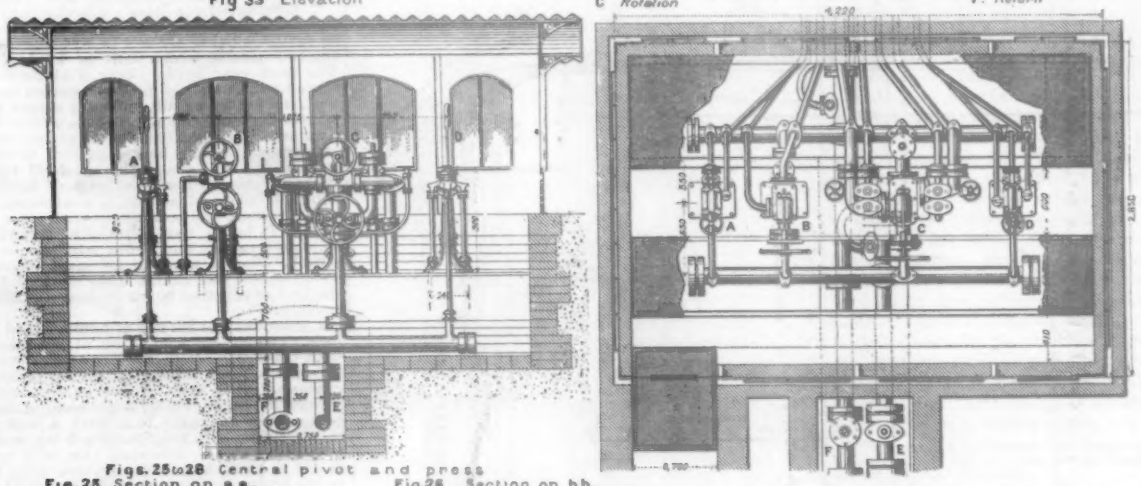
Figs. 33 to 34 Arrangement of Valves and distributing pipes

Fig 33 Elevation

A Pivot
B Tilting (lifting off lock)
C Rotation

Fig. 34 Plan

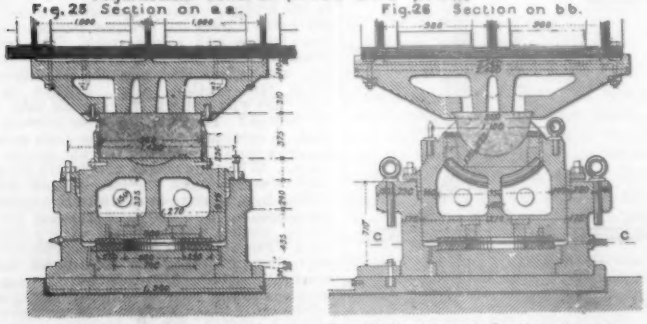
D. Locking & unlocking
E. Supply pipe
F. Return



Figs. 25 to 28 Central pivot and press

Fig. 25 Section on aa.

Fig. 26 Section on bb.



Figs. 29 & 30: Presses for lifting off lock

Fig. 29. Elevation

Fig. 30. Section. dd

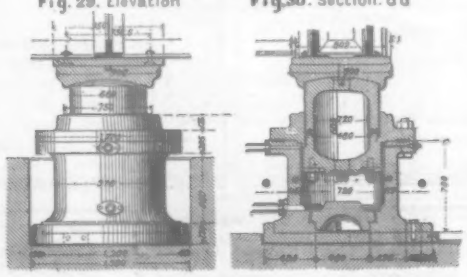
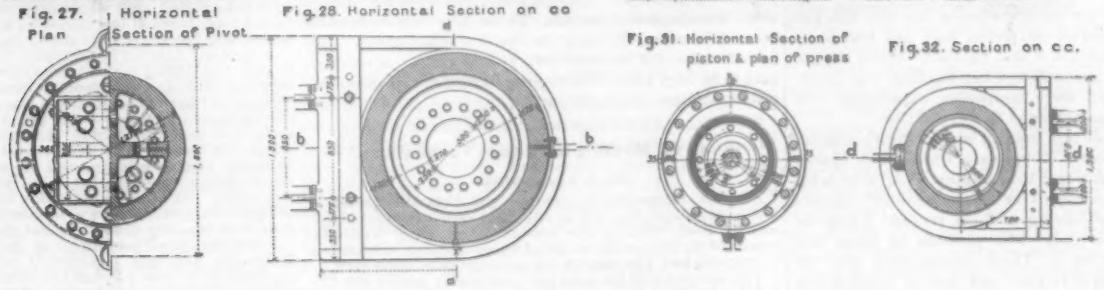


Fig. 27. Plan, Horizontal Section of Pivot

Fig. 28. Horizontal Section on cc

Fig. 31. Horizontal Section of piston & plan of press

Fig. 32. Section on cc.



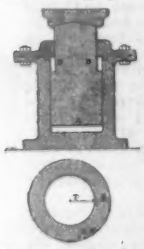
MACHINERY OF THE POLLET SWING BRIDGE.

The Pollet Swing Bridge.

In our issue of Aug. 26 appeared general illustrations and a description of the Pollet swing bridge at Dieppe, France. Late issues of *The Engineer* give illustrations and descriptions of the machinery for swinging the bridge, part of which we reproduce:

Machinery: General Arrangement.—The use of hydraulic pressure for working the swing bridges was adopted without hesitation, hydraulic machinery having been already installed in the port of Dieppe in order to work the engines of the locks connected with the new maritime establishment. To choose between the different mechanical systems was more difficult. A movable bridge is generally supported by three supports, one at the extremity of the longer suspension, the other at the extremity of the short span, and the third being the central support. Starting from this point, the systems may be reduced to three principles.

By the first system, the supports at the long and at the short swing span ends are fixed; the superstructure is invariably fixed to the head of a hydraulic pivot. To unlock the end supports before rotation, the pivot is raised to a height corresponding to the deflection of the spans. By the second system the supports are movable; the superstructure is carried by a pivot surrounded by a crown of rollers. Before rotation the extremities of the girder are released, being raised by hydraulic screwjacks which permit the wedges placed between the support blocks to be withdrawn. The bridge is at a fixed level. By the third system the support of the short end of the girder is movable, and that of the long end is fixed; the superstructure rests on the pivot without being fixed to it, but can, on the contrary, rotate around it. The extremity of the short end of the girder is detached before rotation, being raised by hydraulic lifts, which enables the wedges forming the supports to be withdrawn, as in the previous case; the superstructure being no longer sustained at the extremity, balances, and the girders can swing.



The first system is very simple, which has caused it to be adopted for structures of small dimensions; for bridges of long span it presents a serious difficulty. On account of the great weight of the superstructure, and of the relatively considerable deflection that the girders take, the pivot must be of large diameter, and be raised to a great height. If during rotation the pivot should fail, either in consequence of the rupture of the pivot press or from a defect in the gland packing, the superstructure might descend suddenly, and great damage might result.

The second system—the bridge with a fixed level—which has been employed for large bridges—notably for the Newcastle bridge—has not these disadvantages, but it presents two others. In the first place, the crowd of rollers, which, together with the pivot, supports the weight of the superstructure, constitutes a complicated mechanism requiring careful working, and is costly to maintain on account of wear. In the second place—and this is an important consideration—the water under pressure must be conducted to the extremity of the girder in order to move the supports, as it would not be desirable to place a water pressure pipe 40 m. in length in the bottom of the channel. In the case of the Pollet bridge it would have been necessary to place a pipe more than 700 m. long, crossing the lock, in order to unite the central machinery to the left bank of the channel, which would be to incur a considerable expense.

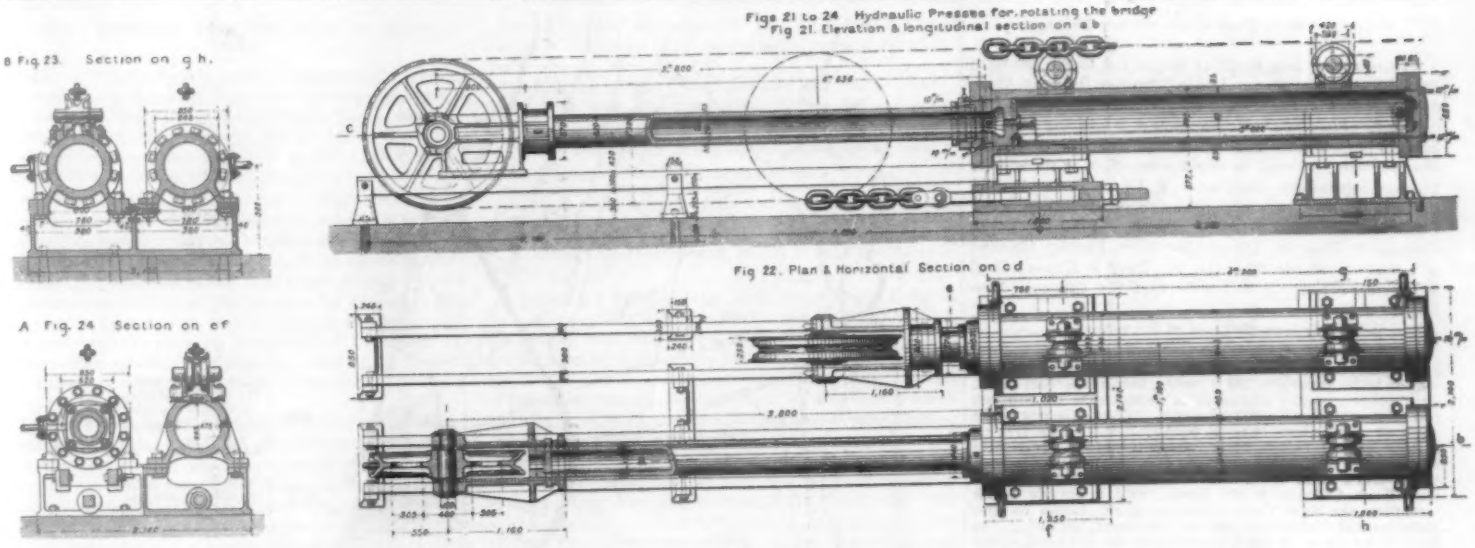
It is the third system—the balance bridge—which has been chosen. The arrangements adopted may be described as follows: The ram of the press, forming a pivot, carries the parts shown in figs. 25 to 28. When working, the superstructure does not rest on the pivot, a play of some millimetres being left between the two cylindric surfaces. The ends of the girders rest on a plate of cast iron *A*, fig. 4, fixed to the edge of the wall on the left hand, at 5.34 m. from the pivot, on a cast iron plate *B* fixed to the border of the right-hand wall, and at the extremity of the girders on a movable support *G*, formed of a sliding wedge between the cast iron plates, one bolted under the superstructure, the other fixed into the masonry. The shorter swing arm of the girders carries two rollers *D*, placed 20.50 m. from the pivot. These rollers are normally 0.16 m. above the path over which they run, formed of a circular rail fixed into the masonry, as shown in the large engraving, Aug. 26. Two hydraulic jacks, called balance presses, are also placed in the masonry to the right of the principal girders 18.42 m. from the pivot.

The diameter of the pivot is such that under the action of the water, at a pressure of 50 kilogs. per square centimetre, the vertical pressure that it exercises under the superstructure is insufficient to raise it; the rising can only take place when the pressure of water is made to act simultaneously in the pivot press and in the balance presses. As in all bridges moved by water pressure, the rotation is obtained by means of two apparatuses worked by ropes, placed parallel under the superstructure on the central pier. The rotating chain is fixed to one of these apparatuses, passes round the cast iron crown, which is fastened below the superstructure and joins the other rotary press, as shown in the supplement. The bridge on being brought into use, the opening is effected in the following manner: (1) To throw the pressure on to the central press—the pivot—the cock is opened and put into communication with the water under pressure; the pivot takes up the play mentioned and then stops, the central press being insufficient to raise the superstructure. (2) To bring the pressure to bear upon the balance presses, the cock is opened and they are brought into communication with the water; the pistons come into work under the ends of the girders, and the superstructure rises under the combined lift of the balance presses and of the central press; it is sufficient to maintain the superstructure at some millimetres above its normal horizontal position, in order to withdraw the supports. To lower the culasse, or short end of the girder, the apparatus which governs the movement of the wedges of the supports of the culasse are put into communication with the water pressure. The wedges retire, and the extremity of the culasse becomes free. (4) To set the superstructure in balance: The superstructure being still sustained by the central and balance presses, the latter are emptied. The pistons descend under the weight of the superstructure, the culasse—on account of its excess of weight of 20 tons—descends and rests on the rolling path. During this balancing the central press remains under pressure; but as it is insufficient of itself to support the superstructure, the pivot descends at the same time and bears upon the bottom of the press cylinder. (5) To turn the bridge: Pressure being maintained in the central press to diminish the weight on the surface of the bottom of the press cylinder, the rotating presses are put into communication with the water pressure.

The pivot of the bridge is 1.27 m. in diameter; the hollow semi-cylinder, which serves as a socket to the rod fixed under the trimmer, and which is forged in one with the piston, 0.90 m. long and 0.65 m. in diameter. The bottom of the pivot and of the press cylinder carry a circular steel band 1 m. in exterior diameter and 0.50 m. in interior diameter, projecting 0.020 m; it is by the circular surface of these bands that the pivot rests on the bottom of the press cylinder. The steel band fixed to the pivot is furnished with grooves, to facilitate greasing. The body of the press is of cast iron, 0.175 m. thick. The interior of it communicates with the water pressure, which before entering it crosses a cylinder full of glycerine, so as to secure a perfect greasing.

The power exercised, therefore, under the pivot being 50 kilos. per square metre, is $\frac{\pi \times \overline{1.27}^2}{4} \times 50$ kilos., making 633,385 kilos., insufficient to raise the bridge, which weighs 810 tons, without the help of balance presses. During rotation, the pivot resting on the steel crown, projecting from the bottom of the press cylinder, is charged with the total weight of superstructure, 810 tons, diminished by the weight of the culasse, 20 tons borne by the rollers, making 790 tons. A part of this weight is balanced by the water pressure, which acts under the pivot beyond the surface of support, over a zone of $\frac{\pi}{4}\left[\overline{1.27}^2 - \left(\overline{1.00^2 - 0.50}\right)^2\right] = 6.777$ square cm., and on the grease grooves representing further 1.21 square cm., making a total of 7.900 square cm. The pressure is 7.900 × 50 kilos. = 399,500 kilos.; this leaves for the weight borne by the supporting crown 790,500 kilos. — 399,500 kilos., being 390,500 kilos. There is, consequently on the friction surfaces a pressure per square cm. of $\frac{390.500}{\frac{\pi \times \overline{1.27}^2}{4} - 7.900} = 84$ kilos., a very low figure for steel, so that the durability of the surfaces is secured.

Balance presses.—The balance presses consist of a plunger piston, movable vertically in a cylinder and surmounted by a plate, which acts under the flanges of the principal girders at the moment of rising. The piston


Figs 21 to 24. Hydraulic Presses for rotating the bridge
Fig 21. Elevation & longitudinal section on a b
B Fig 23. Section on g h.
A Fig. 24 Section on e f
Fig 22. Plan & Horizontal Section on c d

MACHINERY OF THE POLLET SWING BRIDGE.

and the cylinder are of cast iron; they have been covered with a bronze jacket 0.01 m. thick. The lower part of the piston is 0.22 m. high and 0.74 m. in diameter, which is reduced to 0.66 m. in the upper part, forming a sort of rod to the plunging piston; the reduction of the diameter produces at the point where it takes place a retreat, $\frac{0.74-0.66}{2}$, forming a circular surface of 0.04 m. in width. The cylinder or body of the press has two orifices; one at the lower part, enabling the under part of the piston to be brought into communication with the water pressure, or with the pipe ending at this orifice; the other at the upper part, enabling the water pressure to be brought to bear on the circular surface of the piston. When the two orifices are simultaneously brought into communication with the water pressure, the press rises, owing to a corresponding strain of 50 kilos. per square centimetre acting on the surface of a circle 0.66 m. in diameter—the surface difference between the base *A* and the circular surface *B*. If while leaving in communication the upper orifice with the water pressure, the lower orifice is put into communication with the evacuation, the press descends and comes to a standstill in consequence of the pressure which is exercised on the circular surface of the piston. On a line with the presses when balancing takes place, the superstructure falls 0.147 m. —0.16 m. from the culasse rollers. If about 0.147 m. be added to this figure, 0.010 m. corresponding to the rise which has to be given to the superstructure to bring it to its normal position to facilitate the landing or unlanding, it will be seen that the necessary stroke to be given to the piston is 0.157 m.; the difference 0.230 m.—0.157 m.=0.073 m., is the play which during rotation remains between the bridge in balance and the press in repose. The diameter 0.66 m. has been determined by the following considerations. When the superstructure is raised in balance, the whole weight of the bridge is at first thrown on the central press, the tilting or balance presses having only to support the preponderance—20 tons—of the culasse over the long arm or *volée*; little by little the extremity of the *volée* near its resting place, and when the contact is established, while the balance presses continue to raise the culasse, the superstructure bears upon three points, viz.: the supports of the *volée*—the central press—the balance presses.

Heavy Milling Machine.

The accompanying cut shows a machine lately brought out by Pedrick & Ayer, of Philadelphia. It is similar to their "heavy universal milling machine," but its cutting and feeding power is much greater. The spindle is of steel, finished by grinding. The bearings are concentric, self-closing, always keeping the spindle in its original position both lateral and central. The table is 68 in. long and 14 in. wide, with three T slots on top and one T slot on each side. It can be lowered below the centre of the spindle 20½ in. It has an automatic feed of 40 in. either way without changing the belt, and an adjustment in line with spindle of 12 in. This gives a great range for work of unusual shapes. Milling can be done 26 in. from the face of the column, and cutters 18 in. in diameter can be used to reach into parts when necessary. The spindle is 54 in. from the floor, and is driven by a four step cone for 3¾ in. belt. The cone feed belt is 2 in. in diameter. The cutter arbor supporting bar is 4½ in. in diameter, of hammered machinery steel, and is supported by a harness that holds the bar, knee and centre together, making it impossible for the bearing to yield even to very heavy cutting. An extra centre support is also furnished when short arbors are to be used. The gibs are all either steel or bronze, and a plain vise with steel jaws 8 in. wide, 2 in. deep, opening 5 in., with clamps to fasten to the bed in any position, is furnished with the machine. The weight of the machine is about 5,500 lbs.

Pocahontas Coke.

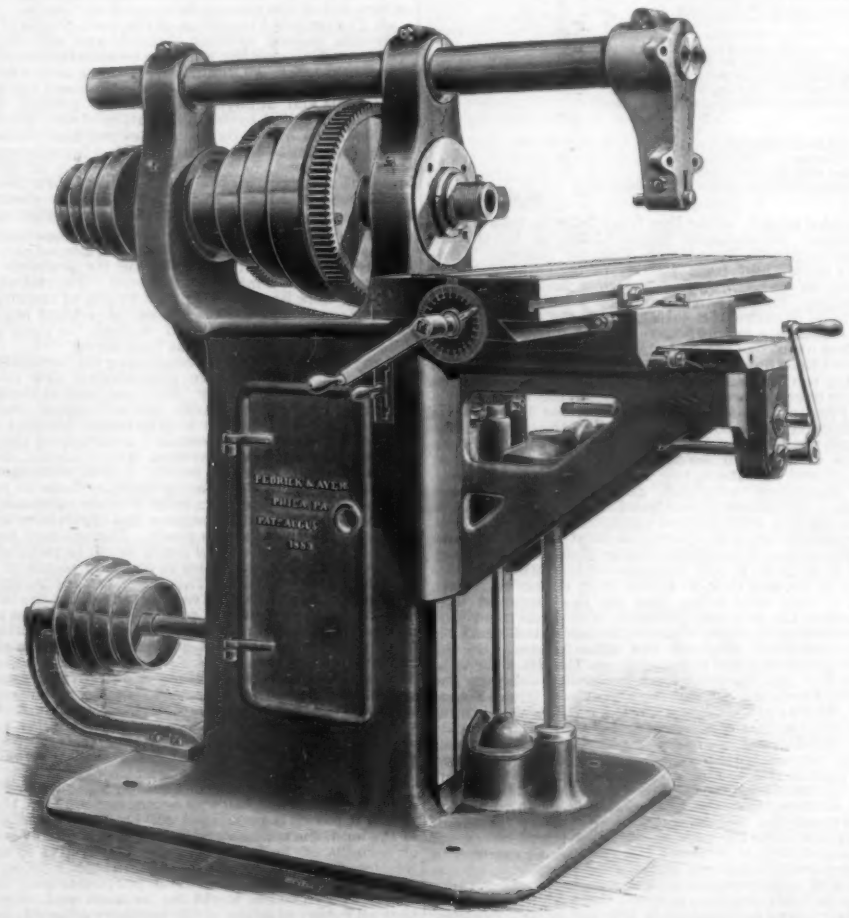
A late census bulletin gives details respecting the production of coke in the Flat Top region of Virginia and West Virginia, known as the Pocahontas district, a region in which this industry has been developed within a few years, as Mr. Porter states, "with an unusual degree of success," due to the fact that "the coal peculiar to this district possesses high coking qualities." It appears there were 533 persons employed at Flat Top coke works in 1889, to whom $149,727 was paid in wages, and that 25,883 cars of coke were shipped thence in 1890, as compared with 8,605 carloads in 1887, of which 9,143 carloads in 1890, as compared with 1,275 carloads in 1887, were shipped to points south of Bristol, Tenn., thus evidencing the increasing demand from furnaces at Chattanooga, Florence, Sheffield and other points in Tennessee and Alabama and elsewhere in the South for coke. The number of coke ovens in operation in 1889 was 1,833, valued at $542,219, as compared with 200 in 1883, valued at only $44,345. The immense Flat Top coal field comprises a total of about 175,000 acres "actual coal land," of which 17,418 acres were under lease to 17 parties in 1890. A report made at the close of 1890 showed that up to that period 8,237,734 long tons of coal had been mined, and that only 899.7 acres of coal lands had been mined out of this territory, the average yield of which to the close of 1890 was 9,156 tons of coal per acre. The combined length of the Flat Top and New River coal field "is about 60 miles, relatively equal to that of the Connellsville basin in Pennsylvania, but the breadth is more than five times as great." The amount of capital reported invested in this industry was only $744,576 in 1889, but this did not include the value of the leases or the leased land. The estimates given, with such factors included, puts the total capital invested in the land, leases, plant, etc., at $1,528,386 in 1889.—*Bradstreet's.*

Rock Slides on the Arlberg Railroad, Switzerland.

Some of the dangers of mountain railroading have been very strikingly demonstrated by the extensive rock falls on the Arlberg railroad in Switzerland last July. From particulars given in the *Zeitschrift* of the Austrian Engineers' and Architects' Society it appears that the roadbed was entirely destroyed for a length of about 300 metres, being covered with boulders and débris generally to a depth of more than 16 ft. The fall, it is feared, is only the first of several more to occur, and the opinion has been expressed that the only efficient safeguards against serious accidents will be either a complete change in location of the road to the other side of the mountain, or the building of a tunnel about one kilometre long, through solid rock further in the mountain side. It is thought that the tunnel expedient will be adopted as the cheaper, and, on the whole, the better one. Until this new location can be made ready for traffic—which will not be within a year's time—the present line will have to continue in use, though it will undoubtedly be subject to further more or less serious traffic interruptions from additional rock falls. As a matter of fact, since the first great fall which occurred on July 9, three others, on the 10th, 13th, and 14th of the same month, occurred, so that it was not until July 26 that regular traffic on the line could be resumed.

The Harlem Lift-Bridge.

The New York Central's lift-bridge over the Harlem was opened for the first time last Sunday. It took one minute and twenty seconds to raise the draw and the same time to lower it. This bridge, which was designed by Mr. G. H. Thomson, was described with illustrations in the *Railroad Gazette* of June 10.



HEAVY PLAIN MILLING MACHINE.

Made by Messrs. PEDRICK & AYER, *Philadelphia.*

Proposed New Belt Railroad for Chicago.

A committee has recently submitted to the Board of Directors of the Chicago Union Transfer Railway Company a report on the location and construction of a belt railroad, which will be acted upon at a meeting of stockholders in October. The list of stockholders comprises the following railroad companies together with several Chicago capitalists: Baltimore & Ohio; Pennsylvania; Chicago & Northwestern; Chicago, Milwaukee & St. Paul; Chicago, Rock Island & Pacific; Illinois Central; Chicago & Eastern Illinois; Northern Pacific; Chicago & Great Western, (Chicago, St. Paul & Kansas City) Atchison, Topeka & Santa Fe, and the Chicago, Burlington & Quincy.

The following is an abstract of the report:

The general location is shown approximately on the accompanying map and explains itself. The right of way is to be generally 200 ft. wide, being less than 200 ft. only at such points where it is reasonable to suppose that industries will not be located. In no place will the right of way be less than is required for eight tracks. A double-track railroad from the Milwaukee division of the Chicago & Northwestern to the Wisconsin Central, a four-track road from the Wisconsin Central to the New York, Chicago & St. Louis, and a double track road from the New York, Chicago & St. Louis to the Baltimore & Ohio Railroad are proposed, it being the intention to furnish such facilities as are required at the present time to transact the business that all railroads may desire to do over the proposed line, leaving the additional facilities which shall be required in the future to be provided for when necessary.

The width of embankment for double track railroad is to be 28 ft., and for four track railroad 56 ft. The width of excavation for double track is to be 32 ft., and for four track 60 ft. Slopes in earth 1½ to 1, and in rock excavation ¼ to 1. Culverts to be of stone, or stone and iron. Bridges to be constructed with masonry abutments, and steel superstructure. Crossings, where possible, are to be overhead or under. Crossings at grade are to be interlocked. Overhead railroad and highway crossings are to be carried on steel columns, with masonry piers and steel superstructure. The track is to be laid with 80-lb. steel and best pattern of rail joint, oak ties, and gravel ballast.

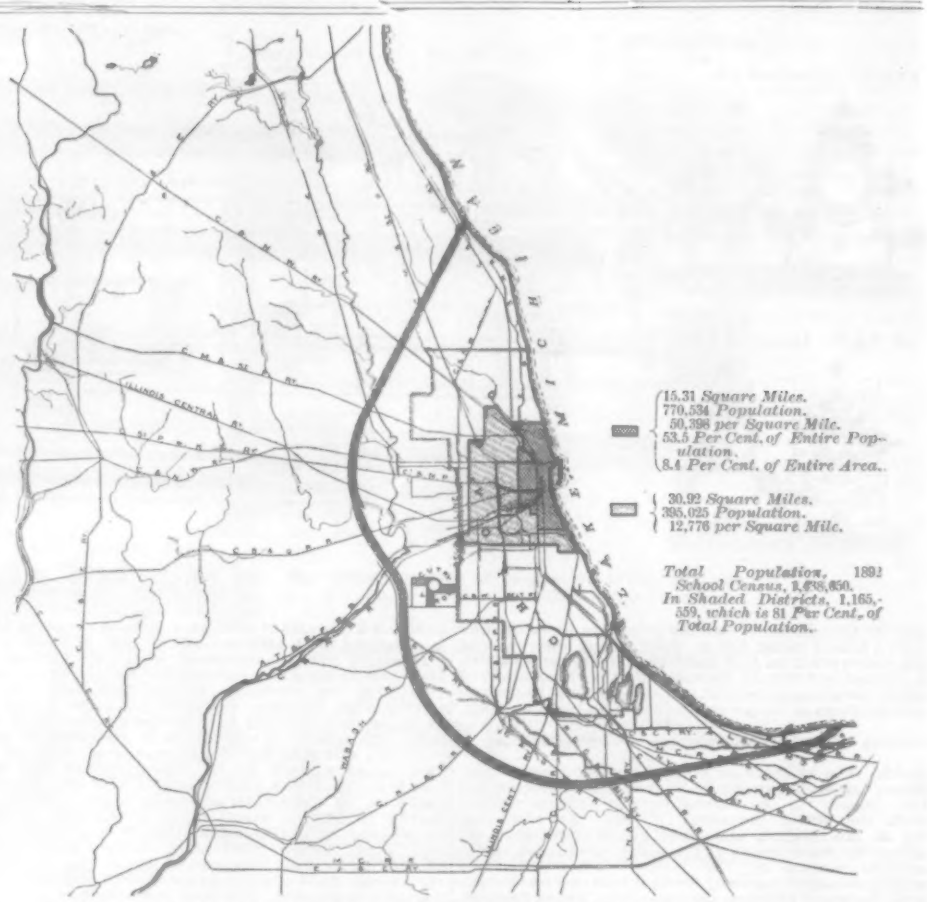
The principal features of the proposed line are as follows:

Total length of line from the C. & N.-W. Ry. to B. & O. R. R.		60.3	miles.
Straight line	58.07		"
Curved line	2.23	60.3	"
Total number of degrees of curvature		353	deg.
Maximum degree of curvature		3	"
Maximum grade per mile		16	ft.
Length of longest maximum grade		1.6	miles.
Miles of track on which grade is 16 ft	13.7		"
Miles of track on which grade is less than 10 and more than 5 ft	17.6		"
Miles of track on which grade is less than 5 ft. per mile	29.0	60.3	"
Maximum elevation above Lake Michigan	71	ft.	
Minimum elevation above Lake Michigan	11	"	
Elevation at highest point above lowest.		60	ft.
Total ascent on whole line		200	"
Sub-grade crossings	11		
Overhead crossings	2		
Grade railroad crossings (at points where there are existing railroad crossings)	5		
New grade railway crossings	5		
Overhead highway crossings	8		
Sub-grade highway crossings	3		
Grade highway crossings	83		
River and creek crossings	7		
Feet of iron bridging on proposed line	1,200		
Feet of iron bridging on other roads	1,100		
Feet of iron bridging on highways	1,320		
Feet of iron bridging on other small openings	250		
Total iron bridging	3,970	ft.	
Arch culverts	10		
Iron pipe and box culverts	60		
Total estimated cost of line from lake to lake		$5,500,000	

The total length of the line from lake to lake will be 63.78 miles. The distance from Chicago & Northwestern Railway to Chicago Union Transfer Railway Yards is 25.9 miles, and from Baltimore & Ohio Railroad crossing to Chicago Union Transfer Railway Yards, 32.9 miles. The line will connect with twenty-three main lines of railroad entering the city of Chicago.

The distance a car will have to be hauled in making transfers is in one case twelve miles farther via the proposed line than via any other proposed route, and in one case ten miles. Out of 572 possible transfers, the distance over the proposed line exceeds the distance via other lines in 166 cases, but the total of the distances via the proposed line is 308 miles less than the total of the averages via the other lines, which shows a saving of an average of 27 3-10 miles per car transferred. The low grades, light curvature, few important highway crossings, numerous overhead and sub-grade railroad crossings, will admit of the handling of heavy trains at high speed and with reduced operating expenses.

The distance from any junction point of any railroad with the proposed line to the Union Stock Yards by way of the U. S. Y. & T. Co. averages $18\frac{35}{100}$ miles; via the C. & C. T. Co. and C. & N. P. Co., $21\frac{26}{100}$ miles; via the C. & W. I. Belt, $23\frac{75}{100}$ miles, and via the proposed line, $27\frac{35}{100}$ miles, the greatest difference of distance in any one instance being 19 miles, while in 13 cases it is shorter via the proposed line than via the other routes; but the advantage of this line is not so much the distance to be traveled as the freedom from annoying delays. The chances for delay in making transfers from Kinzie street, by way of the Union Stock Yards to the Illinois Central, a distance of about nine miles, can be readily appreciated from the fact that the route crosses 67 highways, 8 horse car lines, three cable lines and eight lines of railroad on which are operated the trains of 16 railroads running 456 passenger trains daily. On three of these highways 5,442 vehicles and 12,193 pedestrians cross the tracks in thirteen hours; on one of these cable lines 716 cars in 13 hours; and on one of these eight lines of railroad 173 trains and engines in 11 hours and 40 minutes, while a safe estimate of the number of engines and trains crossing over this route would be 2,000 per day, or about three trains every two minutes; horse and cable cars, 366 per hour; vehicles, 3,000 per hour; pedestrians, 5,000 per hour, making a total aggregate per hour of 8,449, or an average of 140 per minute.


15.31 Square Miles.
770,534 Population.
50,398 per Square Mile.
53.5 Per Cent. of Entire Population.
8.4 Per Cent. of Entire Area.
30.92 Square Miles.
395,025 Population.
12,776 per Square Mile.
Total Population, 1892 School Census, 1,468,850.
In Shaded Districts, 1,165,559, which is 81 Per Cent. of Total Population.
ILLINOIS CENTRAL R.R.
C. M. & St. P. R.R.
C. R. I. & P. R.R.
MICHIGAN
INDIANA
ILLINOIS

Proposed Belt Line of the Chicago Union Transfer Railway Company.

Owing to the fact that so many of the railroad terminal yards are now located within or near the city limits, and in many cases are so crowded that it seems to be impossible therein to provide for the ever-increasing business, new yards must be provided, on less expensive land, where the public and the movement of the cars will less embarrass each other, and old yards gradually abandoned, for the following reasons:

(a) The constant menace of the street crossing problem, which is rapidly cutting all yards into smaller and smaller sections, rendering them less and less useful on account of the increased expense and delay necessary to operate them.

(b) The increasing danger to life and property, compelling the construction of expensive additional viaducts.

(c) The increased switching mileage rendered necessary on account of the present location of the yards.

(d) The crowded condition of the main tracks of all the railroads, caused by their through and suburban passenger traffic, together with the necessary freight house and team track switching, rendering any additional switching slow and expensive, and in many cases causing serious and annoying delays. As bearing thereon attention is called to the distribution of the population of Chicago as shown by the shaded portions of the map. Within the limits of the heavy shading is contained more than 50 per cent. of the entire population of the city, and in this district all the railroads have their passenger and freight terminals, while in the lighter shaded district, nearly all the transfer work is accomplished.

In view of the above and many other considerations, the line has been so located that each railroad can secure yard room and facilities ample for its probable future requirements at a minimum expense. The railroads terminating here have, within the limits of the city, 246.5 miles of main track, 230.5 miles of second main, and about 900 miles of yards and sidings, a total of 1,377 miles of track covering about 7,000 acres.

Many railroads, already recognizing the necessity of increasing yard facilities, are now seeking new locations at points beyond the busy districts; and if there is no concerted action new yards will be located only with reference to some specific requirement, dictated by the business of the line so locating; overlooking the necessity of a comprehensive system which should simplify all transfer and terminal work. A few years ago a majority of the railroads entering Chicago made all freight-car transfers via the main lines of other railroads, sending their own switching engines and crews over miles of the main tracks of foreign roads. The business has now outgrown this method and roads begin to recognize the necessity of having facilities at common points at which transfers may be made. This improvement on the older plan is apparent to all. Transfers made by the old way cost and still cost, where permitted, much more than a profitable switching charge even on the existing belt lines, and subject the cars so transferred to an ever increasing delay.

This company having already acquired the necessary yard facilities for sorting and delivering to the various railroads the mixture of cars it may receive from the various yards, we think this or some similar line an absolute necessity, and the earlier it is secured the cheaper and better for the interests of the railroads terminating here, their patrons, and Chicago.

Among the advantages of locating and securing right of way for this belt railway before the country through which it passes is populated will be: The present value of the land, the concessions that would probably be made on account of the increased value it will give to the adjoining property by creating desirable locations for manufacturing and industrial purposes, and that it makes known to the world its location and object, so that all future platting of the territory affected thereby will be made in conformity with its known and intended use, and all streets, buildings and improvements will naturally adjust themselves to this known condition.

The necessity for taking immediate steps in some definite direction, looking to the construction of an adequate transfer system, may be more readily realized by a consideration of the growth of the railroad systems which terminate in Chicago. The increase in mileage of ten leading roads terminating in Chicago, between the years 1870 and 1890, was 370 per cent.; the increase in tonnage was 490 per cent. The tonnage of all roads entering Chicago increased from 1880 to 1890, 131 per cent., and from 1885 to 1890, 72½ per cent., reaching a total of 119,284,935 tons, which was $17\frac{7}{10}$ per cent. of the entire tonnage of all the railroads in the United States. We find that the receipts and shipments of a few commodities at Chicago during the year 1890 aggregated 1,664,000 car loads. There being about an equal number of empties handled makes an aggregate of 3,388,000 cars. It seems from the data we have been able to collect that about 40 per cent. of the entire tonnage of the roads terminating here is handled in Chicago, or nearly 50,000,000 tons for the year 1890; this would make about 6,000,000 carloads.

During the year 1891 the C. & W. I. Belt transferred 580,871 cars, the Chicago Railway Transfer Association 582,487 cars, the St. Charles Air Line 180,837 cars. Of the direct transfers the C. & N. W. made 404,551, the C., B. & Q. 150,006, which aggregates 1,890,352 transfers. From other data and estimates, the direct transfers made by other roads would, in our opinion, reach about 2,500,000 cars, making the total for 1891 nearly 4,400,000 cars handled.

Another reason for taking some steps looking to the relief of the railroad business here, is the constant, and at present unavoidable, delay in handling cars, coupled with the unnecessary delays on team and industrial tracks. The delays from this last cause will aggregate 1,500,000 car-days per annum, while delays arising from existing yard locations, inadequate and expensive transfer facilities, will reach, at a low estimate, 5,000,000 car-days per annum. The average earnings per car-day in the United States, as deduced from the reports of 1890, is $1.90, the average time consumed in loading, shipping and unloading a car is $4\frac{1}{10}$ days for each load, which would make the earning capacity of a car on a long haul, or during the busy season, over $8 per day. It is not claimed, however, that all this could be saved, but we leave it to the operating departments of the various railroads to make their own estimates from the above data.

We believe that the construction and use of this or some other similar system of transfer would not only have the effect of facilitating transfer and reducing delays, but it would also result in relieving from active service from 25 to 50 per cent. of the switching engines and crews now in use, thereby effecting a large saving to the roads annually. One manager says that if a general system of transfer, such as herein contemplated, were adopted, more than 25 per cent. of the switching engines now in use on his road would be relieved, thereby effecting a saving of $100,000 per year to his company.

The report is signed by Messrs. H. H. Porter, J. M. Whitman and Andrew Crawford, Committee, and W. S. Jones, Chief Engineer.

The New Fast Passenger Ships.

The contracts have been let to the Globe Iron Works, of Cleveland, to build the two passenger ships, heretofore referred to, which are expected to make the run from Buffalo to Duluth in 50 hours. The iron and steel for most of the large ships built on the Great Lakes has been made at the Carnegie and other Pittsburgh mills, but the orders for the steel for these new ships have been awarded to Cleveland firms. The Otis Steel Co. has the contract for all the steel, the Cleveland Rolling Mill Co. for rolling the plates, and the Cleveland City Forge for the heavy shafting.

Connelly's Improved Taps and Drills for Screwed Stays.

Figs. 1 and 2 show an improved tap especially adapted for tapping the holes for long screwed stays in locomotive boilers. This tap is made in two parts with corresponding threads. Through the centre of these taps is a threaded bore through which passes a spindle with threads to correspond with the thread in the bore.

The threads of the spindle have the same pitch as the threads of the tap. The object of the spindle is to guide the tap in a straight line, and to make the threads in one sheet a continuation of the threads in an opposing sheet so that the screwed stays will enter without undue resistance or straining the sheets. In operation this tap can be used by two men at the same time, one on the inside and the other on the outside of the locomotive boiler. The spindle is especially valuable in tapping the holes for radial stay boilers where the stays are inclined to the sheet.

Figs. 3, 4, 5, 6 and 7 show another form of staybolt tap suitable for use in replacing screwed stays that are difficult of access in such places as behind the frames and drivers of locomotives. With these devices the work is accomplished by removing the old staybolt and then rethreading the staybolt holes from the inside of the firebox. The spindle, fig. 4, is placed in the old tapped hole in the outside sheet. The tap, fig. 3, which is hollow and fits the spindle, fig. 4, is then slipped over this spindle and the hole in the inside shell tapped in correct alignment. When the hole in the inner sheet is tapped to the required dimensions, the first tap and plug are removed, and the second, figs. 5 and 6, are inserted. There is a comparatively thin washer on the end of the spindle, fig. 6, in the outer hole. The second tap, fig. 5, is then screwed into position and is guided by the spindle in correct alignment until the outer hole is tapped. During the last ⅛ of an inch the thin washer and spindle are forced through the outer sheet. The second tap is not channeled the entire length, as it is not intended to cut the hole in the inside sheet, but only to serve as a guide to the end of the tap. This operation is all shown in fig. 7.

Figs. 8, 9, 10, 11 and 12 show drills and devices for drilling out and removing old or broken staybolts from locomotive fireboxes conveniently without removing the boiler from the frame. The difficulty in this class of work is to guide the drill properly when drilling out the staybolt in the outer sheet when the drilling is done from the inside of the firebox. These devices consist of a threaded hollow spindle guide, fig. 12, through which passes either the straight drill, fig. 11, for drilling a small hole first, or a reduced shank drill, fig. 10, to drill out the hole full size. Fig. 9 shows a shank which will adapt both drills to one ratchet. As shown in Fig. 8, the operation is as follows: After removal of the bolt from the inside sheet by drilling, as usual, the threaded guide is inserted and screwed through the sheet as far as possible and secured by a check nut. Through the centre of this guide is passed the drill which is in this way properly aligned. When it is desired to drill the hole larger, the shank of the drill, fig. 10, is inserted in the guide before the guide is screwed into the inside hole.

These devices are inventions of J. T. Connelly, Milton, Pa., and are used extensively on the Chicago & Northwestern, Wabash, Mexican Central, Erie, Atchison, Topeka & Santa Fe, East Tennessee, Virginia & Georgia, and other roads, the mechanical officers of which speak highly of their operation.

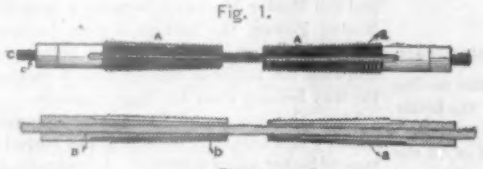


Fig. 1.

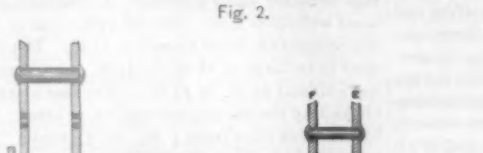


Fig. 2.

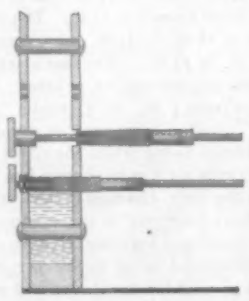


Fig. 7.

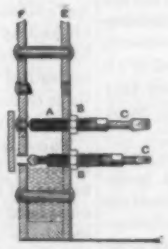


Fig. 8.

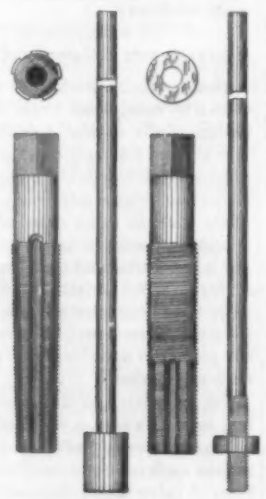


Fig. 3. Fig. 4. Fig. 5. Fig. 6.

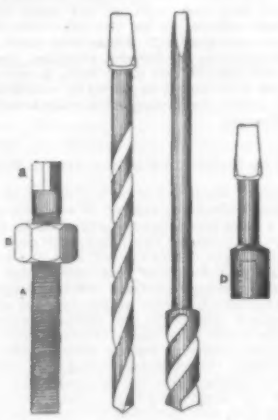


Fig. 12. Fig. 11. Fig. 10. Fig. 9.

Taps and Drills for Screwed Stays.

THE SCRAP HEAP.

Notes.

The Chesapeake & Ohio has increased the pay of firemen 2½ per cent.

It is reported that 11 passenger conductors have been discharged from the Chicago division of the Baltimore & Ohio.

The telegraph operators of the Burlington, Cedar Rapids & Northern have presented a request for an increase of pay.

Three entire freight train crews of the Philadelphia, Reading & New England were discharged last week, and it is reported that their offense was stopping at a non-telegraph station in the night to take a long rest.

The Michigan Central has an evening school for apprentices and journeymen at its shops at St. Thomas, Ont., and gives money prizes for the most successful students. An examination of the art school class was recently held, and the first prize of $15 was awarded to A. S. Healey and the second of $10 to A. Pollock.—*Exchange.*

A passenger agent of the Atchison, Topeka & Santa Fe at Kansas City has been discharged, and two or three conductors will receive similar treatment, for having in conjunction with the agent collected fares which were not turned into the company. It is said that the cases of these men furnish the only basis for the reports which have been widely published stating that a large number of conductors have been detected in stealing at Kansas City.

The relief department of the Pennsylvania lines west of Pittsburgh has just completed its third year. The average number of members during the past year was 11,534. The regulations require that at the end of each term of three years the surplus shall be adjusted. For this first three-year term the northwest system shows a surplus of $7,806, but the southwest system, owing to a large number of cases of la grippe, comes out with a deficit of $20,761. This will be made up by the company.

A riot occurred last Saturday on the Wilkesbarre & Eastern Railroad, in Pennsylvania, which is in course of construction. One of the contractors has in his employ 150 colored men, whom he brought from Virginia. The colored men declared that they were badly treated, and several times they rebelled. Saturday morning 20 of them gathered, fought the white superintendents with clubs and stones, and most of them escaped from the camp. Two of the colored men were shot, and one of them was seriously wounded.

The railroads are gradually recovering from the blockade caused by the strike. Freight is now moving freely and the yards are being gradually cleared up. Empties are being rushed through on the Western New York & Pensylvania, Buffalo, Rochester & Pittsburgh and Buffalo & Southwestern. Many of the old men have been put back to work. The last deputy sheriff was withdrawn from the railroad yards Wednesday (Aug. 31). Everything is quiet. The Police Board will investigate the charges in reference to the conduct of policemen during the strike.—*Buffalo paper*, Sept. 2.

Foreign Notes.

An experimental tunnel section is to be driven at Berlin to determine whether the proposed underground electric railroad will meet with any insurmountable structural difficulties.

The Ragaz-Wartenstein cable rack railroad in Switzerland, to which reference has already been made in the *Railroad Gazette*, was given over to traffic during the early part of August.

The latest Zuyder-Zee (Holland) reclamation project is to cut off the lake from the tides of the North Sea near the island Wieringen. The lake area is then to be divided into four sections by dykes, each section to be separately drained. The work, it is thought, will occupy somewhat over 30 years and will yield an area of arable land amounting to over 200,000 hectares.

A direct recording dynamometer or power meter for steam engines, designed by Messrs. Piquet & Co., of Paris, is illustrated and described in the *Revue Industrielle* of July 23, 1892. It is not designed to supplant steam engine indicators and other apparatus and methods of precise measurement but simply to afford power users a means of directly reading off from a dial, without any calculation whatever, the horse-power of an engine developed at any particular time. The apparatus is portable and can be easily applied to any engine.

One of the several projects which have been under consideration for several years past for utilizing the water power of the river Rhone, in France, promises finally to take definite shape. According to the *Revue Industrielle*, it seems likely that a franchise will soon be awarded to a company of Lyons capitalists, known as the Lyons Syndicate, permitting them to carry the water of the river from a point between Jons and Lyons through an 18,000 meter (about 11 miles) navigable canal to a 12,000 H. P. generating station, from which power is to be distributed electrically to the city of Lyons and vicinity. The syndicate, it appears, is ready to bear the whole expense of the undertaking, and to turn over its possession to the government at the expiration of 99 years.

Some peculiar experiences have been gained in connection with the asphalt pavements in the streets of Frankfort-on-the-Main. Shortly after they had been put down, in 1885 and 1886, cracks of varying lengths and from 0.8 to 1.2 in. deep were formed in the asphalt, resembling those sometimes formed in earth under great heat. The cracks were found to extend mainly along the lines of the gas mains in the streets, and odors of illuminating gas were freely given off from them. Removing the asphalt surface showed that the béton foundation layers immediately underneath were also cracked, permitting the gas leaking from the mains to come in direct contact with the asphalt. The latter, it appeared, absorbed more or less of the gas elements, principally benzine, and through their action lost all its cohesive properties, finally cracking in the manner referred to.

World's Fair Notes.

From the applications already on file it is estimated that more than 100,000 men will participate in the great civic parade at the time of the dedication of the World's Fair buildings in October.

Applications for space in the Electricity building at the World's Fair aggregate 388,000 sq. ft., while only 185,000 ft. are available. Foreign nations have already been assigned 68,000 ft., and several of them are urgently asking for more.

On each side of the MacMonies mammoth memorial fountain in front of the Administration building at the World's Fair will be a huge electrical fountain which will throw a stream 150 ft. high, brilliantly illuminated by variously colored electric lights.

Above 10,000 men are now employed at Jackson Park, most of them being unskilled laborers engaged in house cleaning. All of the Exposition buildings and nearly all of the 25 State buildings have reached a point where their completion by Oct. 1 is certain.

The World's Fair passenger station, in the southwest corner of Jackson Park, will be 150×300 ft., with an annexed trainshed 100×672 ft. The contracts for the main building were let last week as follows: Carpentry work, $118,115; painting and glazing, $8,979; roofing and sheet metal work, $5,425; exterior covering, $91,969.

General Manager E. St. John, of the Chicago, Rock Island & Pacific, as Chairman of the Finance Committee on Railroads, has received a subscription to the World's Fair stock of $20,000 from the Southern Pacific. This sum added to what has been previously secured will swell the total subscription of the railroad companies to nearly $1,000,000. The Finance Committee have practically decided to put $4,000,000 in six per cent. bonds on the market early in November. This issue of bonds has been contemplated from the start, as it was known that after the entire capital stock was exhausted and the Government appropriation absorbed, several millions more would be needed to carry the enterprise through until the gates of the fair were opened. The committee have not yet decided whether the fair buildings or gate receipts will be offered as security for the bonds.

Freight on a Street Railroad.

The Albany Railway Co., which operates a street railroad between Albany and Troy, N. Y., on the west side of the Hudson River, has ordered four baggage cars, and intends to establish an express freight business. Freight houses will be established at both ends of the line, and it is expected to run a car each way every hour during the day. The company also proposes to call for and deliver goods, like an express company. The cars on this road are propelled by electricity.

The Railroad Over the Andes.

It is announced that the railroad between the Argentine Republic and Chili has been so far completed that the steamship companies in Europe sell through tickets from Southampton and Liverpool to Valparaiso by this route. The contractors, Messrs. Clark, have established a line of carriages across the pass between the termini of the railroads and carry passengers over in two days. The rates from London to Valparaiso by this route are $200 and $250, according to stateroom on the Atlantic steamer, and the trip can be made in about twenty-eight days. The railroad journey is 34 hours.

RAILROAD GAZETTE

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EDITORIAL ANNOUNCEMENTS.

Contributions.—*Subscribers and others will materially assist us in making our news accurate and complete if they will send us early information of events which take place under their observation, such as changes in railroad officers, organizations and changes of companies in their management, particulars as to the business of the letting, progress and completion of contracts for new works or important improvements of old ones, experiments in the construction of roads and machinery and railroads, and suggestions as to its improvement. Discussions of subjects pertaining to* ALL DEPARTMENTS *of railroad business by men practically acquainted with them are especially desired. Officers will oblige us by forwarding early copies of notices of meetings, elections, appointments, and especially annual reports, some notice of all of which will be published.*

Advertisements.—*We wish it distinctly understood that we will entertain no proposition to publish anything in this journal for pay,* EXCEPT IN THE ADVERTISING COLUMNS. *We give in our editorial columns* OUR OWN opinions, *and those only, and in our news columns present only such matter as we consider interesting, and important to our readers. Those who wish to recommend their inventions, machinery, supplies, financial schemes etc., to our readers can do so fully in our advertising columns, but it is useless to ask us to recommend them editorially, either for money or in consideration of advertising patronage.*

The Safety of Passen ers at Stations.

The Central Railroad of New Jersey has caused a great deal of dissatisfaction among Westfield commuters by erecting a long fence between its tracks in front of the station at that place. The handsome new station stands on the north side of the tracks, and the town lies north of the station. A tunnel was cut under the tracks in order that passengers might not be obliged to run the risk of accidents by crossing the tracks, and to further guard against accidents [to compel people to use the tunnel] the fence was built between the tracks. The west bound trains run on the station side of the fence. Unfortunately the greatest travel is in the opposite direction, and passengers are compelled to purchase their tickets at the station and then pass through the tunnel to the opposite side in order to board the train for New York. A covered platform is the only protection afforded on that side. The fence has proved such an inconvenience that many who travel on the road have signed a petition asking for its removal. Some have even threatened that if the fence is not taken down by the railroad company they will tear it down themselves. Although the crossings at other stations are equally dangerous Westfield is the only station at which such extreme precautions have been taken.—*New York Sun.*

All of which goes to show that it is a delicate matter to try to keep people from killing themselves. The action of the Jersey Central is of course just right, for people will risk their lives in front of closely approaching trains at a place like Westfield every day, if the circumstances are such that they can save a half minute's time by so doing. The fact that other stations have not been provided with fences simply indicates that the company is behind the times. It began running fast trains several years ago, and the traffic has been increasing from year to year so that at stations where many of the trains pass through at full speed the danger is really great. But this danger is very familiar; it is apparently but little worse than that which thousands of passengers have successfully braved at stations all over the country for many years; comparatively few people are killed, and those few are mostly drunk or infirm from age; and so those people who keep their wits constantly about them without any effort, feel the restriction on their liberty to be very irksome.

And a railroad company can afford to deal very gently with these irritated customers. They do not appreciate the rights of the numerous train loads of through passengers, to whom it is an injustice to slacken the speed of express trains every few miles because of possible danger at an unfenced platform, and they therefore think that a way station can be arranged the same as a big city station where every engine is moved under such complete control that the runner can stop it almost instantly at any spot. These complaining passengers must receive consideration in two ways. They should be made more fully acquainted with the dangers that the fences are intended to guard against, and the interference with their comfort should be made as mild as possible. The essential element in this is to make the under or over passage as easy and as pleasant as possible. A station near New York ought to be on that side of the road nearest the trains going toward New York, but we do not know what obstacles hindered the Central from thus placing the Westfield station, and a passage above or below the tracks is necessary in either case. As a bridge of this kind is generally intended to do service for many years, the ascent should be made extremely easy, even at considerable additional cost. An under passage is always more objectionable than one overhead even if the total ascent be less, so that a 20-ft. lift over the cars is often preferable to a 12-ft. descent and ascent to pass under them. Where large numbers of passengers have to pass to and from a street which goes over or under the railroad near the station the arrangement of platforms and passages, so that they can, in doing this, make a break midway—can make part of the ascent on leaving the cars and the remainder, say 100 ft. further on—is a great amelioration of the seemingly unnecessary burden and is well worth its cost.

After doing everything possible in this line to make an easy approach to the cars, the proper course for a railroad manager, when his fence is attacked by people like these at Westfield, is to defend it with his best guns. The New York, New Haven & Hartford provides waiting rooms on both sides, even at quite small stations, and even duplicate ticket offices, we believe; but we are not sure but this is too liberal a policy. Passengers would like to have the money spent for them in some other way.

Improvements in Compound Locomotive Valve Gears.

Those who have claimed that much of the saving shown by compound locomotives is due to the better design of the details of those engines have considerable ground for their theories. The greatest of all the differences between the general run of locomotives and the newer compouuds lies in the boiler, and there is no doubt that, in some cases of reported saving by compounding, the whole amount saved was gained by the use of a larger boiler and therefore larger grate and heating surfaces. But outside of the boiler improvements there have been other advantageous changes, and of all these the betterment of the valve gears is the one that has given the most marked results and is the most radical departure.

Not ten years ago the evolution of the locomotive link motion was at a standstill and custom and tradition had forced, or influenced, designers of locomotives to take such a rut that only slight variations in dimensions of valve travel, lap and sizes of ports were to be found in this country. It was then that the inventor thought he saw a chance to improve, and reap a harvest of royalties, and as a result the Joy, Strong, Meyer and several other valve gears were brought out to give the better economy of steam use in locomotives which it was supposed the link motion could not give, it being thought to be in its most improved form for locomotives. At this time express locomotives to run at 300 to 400 revolutions had $\frac{1}{8}$ in. and $\frac{1}{16}$ in. outside laps and $\frac{1}{32}$ to $\frac{1}{16}$ in. inside lap. Freight engines had $\frac{1}{8}$ and $\frac{1}{16}$ in. outside lap and $\frac{1}{16}$ to $\frac{1}{8}$ in. inside lap. The valve travel varied from $4\frac{1}{2}$ in. for freight and switching locomotives to 5 and $5\frac{1}{4}$ in. for express locomotives. To add one-sixteenth of an inch to the outside lap was considered a matter requiring much careful attention, as it was then commonly believed that small changes in outside lap resulted in decided changes in the action of steam engines of the locomotive type. We have often seen the wise and experienced old master mechanic add one thirty-second of an inch to the outside lap and increase a little the throw of the eccentric—not, however, without some inward feeling of risk—and then watch with bated breath to see the hoped for improvement that would make the engine a "smart one" and a "hummer."

Like variations were made in the lead of the valves and in the ports. Many will now remember the long and short port war on the Boston & Albany, where, by dint of careful watching, a small steam port opening was made to beat a larger one. The offset of the link saddle was kept a secret, and the dimension was given in 64ths of an inch, and altogether, while the general construction and the action of the link motion were well understood, there was a rather surprising ignorance about the effect of the different ruling features of the design. Perhaps all of this resulted from the traditions of experiments—then seldom made—that had been so incompletely carried out as to lead to false conclusion.

With the introduction of the compound locomotive came, not the use of the Joy and other improved or at least patented gears, but a decided improvement of the old Stephenson link motion. The way to this improvement was laid by the Rhode Island Locomotive Works in giving to all express locomotives $1\frac{1}{4}$-in. outside lap and from 6 to $7\frac{1}{4}$-in. valve travel. About this time, or a little before, Mr. L. B. Paxson, of the Reading Railroad, commenced the use of 7-in. valve travel and $1\frac{1}{4}$ outside lap, and $\frac{1}{4}$-in. inside clearance, but this was not generally known, and the matter was kept quiet as long as possible, and it was not until about a year ago that the real reason for the free action of the Reading engines at high speed was given to the public.

One instance will show how averse the old school master mechanic used to be to making changes in the link motion. When the Rhode Island Locomotive Works were asked to build some "fliers" for a road in Maine the new valve motion with 6-in. travel and $1\frac{1}{4}$-in. outside lap was put on them. The master mechanic was a very profane man, and when, in making an inspection of the engines, he discovered that there was not the traditional $\frac{1}{4}$-in. lap and $5\frac{1}{4}$-in. travel for "fliers" he swore long and loud about the "paper mechanic" who wanted to make a fool of him, and without trying the engines, even for a trip, ordered the outside lap cut down to $\frac{1}{4}$ and—sad to relate—forgot to change the position of the eccentrics to suit the new lap. One of the engines started for the station to take a train, but she didn't get there.

It was just such blind adherence to old rules and the, then general, decrying of the experimental man that left locomotive valve gears at a standstill for a long time. But when the railroads began to consolidate and the Master Mechanic became a Superintendent of Motive Power, the technical man became a necessary assistant and it was not long before the indicator laid bare the follies of the old idea of valve motion and the way became clear for improvements.

Then the compound locomotive appeared in this country and naturally enough it has reaped the advantage of better valve motions. A comparison of dimensions will show this. The old valve travel was $5\frac{1}{2}$ in.; the compounds have from 6 to $7\frac{1}{2}$ in. The steam ports used to be large at 15 in. by $1\frac{1}{4}$ in., now the compounds have 20 and 24 in. by $2\frac{1}{4}$ in. The inside lap at $\frac{1}{16}$ in. choked up the old express engine exhaust; the newer locomotives have from $\frac{1}{4}$ in. to $\frac{3}{8}$ inside "clearance" instead of "lap" whether compound or simple, the only limit to the clearance being when the effect on the indicator card becomes such as to show a loss of steam.

These are not the only changes in the steam using apparatus that have improved in the compounds, and, taking all the advantages together, that is, all that lie outside of the compound use of steam *per se*, there is seen to be a just ground for the claims and much good reason in the arguments of those who hold that some of the saving shown by a part, at least, of the tests of compound and simple engines is due to improvements in the compounds that are wholly outside of the double expansion, and that are not made use of in the simple engines with which the compounds are compared. Now, on the other hand, in order that we may do full justice to both types of engines it should be said, for it is true, that the tests made where the designs are truly comparable show the compound to be the superior type for general use.

The Right to Hire Whom You Choose.

"Organization" and "Protection" are in these times on the lips of not only many classes of railroad employés, but on those of "workingmen" in nearly every walk of life, as well as some who do not work much. Among other classes said to be strongly bound together for defense and offense are the liquor sellers of New York State. Railroads come into intimate contact with about every interest in life, and now we have an instance of an encounter, or the elements of one, with these saloon keepers. It appears in a letter, published in the *Inn-Keepers' Journal* of Aug. 27, from P. H. Nolan, of Port Jervis, N. Y., as follows, addressed to the President of the New York State Wine, Liquor and Beer Dealers' Association:

DEAR SIR AND BRO.: The liquor dealers of this place are being harassed and persecuted to an alarming and injurious extent by one Gillis, who is Master Mechanic of the Erie Railroad. His efforts to do us harm can be easily understood, when it is known that Port Jervis is a "railroad town," the business of which is almost entirely dependent upon the action of the railroad company. The Master Mechanic is, therefore, a potent factor either for the injury or advancement of this place. Unfortunately for our trade he is a champion of prohibition, and carries his official position so far as to threaten dismissal from the service of the railroad company to any man who enters a drinking place. A little more than a year ago he tried to defeat us at the polls on the matter of electing an excise commissioner. Notwithstanding his influence and intimidation the people were victorious. Then, in order to retaliate, he inaugurated a system of persecution. The attention of the General Superintendent of the Erie was called to the then existing state of affairs, and he promised that no further molestations would be had from Gillis. For a time all went well. Recently Mr. Gillis has begun a repetition of his former unfair tactics. We do not purpose to submit to them and would, if proper, place the matter before the coming State Convention in order that they may understand the mean advantages that are being taken of our trade; and that they may express their honest condemnation of such unfair methods by resolution; also refer the matter to the Executive Committee for adjustment. . . .

The gist of this lies, of course, in the threat of dis-

missal. As such dismissal is required by the rules not only of the Erie but of many of the best railroads in the country, the attack upon the individual master mechanic is, of course, wholly unjust. It is true that some weak-kneed railroad officers do not post themselves about employés' behavior off duty any more than they are obliged to in order to save their own reputations, and that Mr. Gillis is therefore a somewhat unusual man; but the best railroads, those whose men appear to be the most sober, intelligent and alert, are, we find, pursuing just the policy that this officer seems to be pursuing. They are keeping close watch of their men and are gradually getting rid of those who do not keep perfectly sober all the time. Mr. Gillis is therefore probably doing just right.

The use of the phrase "the people" in the letter we quote would seem to indicate that a majority of the Erie employés at Port Jervis are claimed to be frequenters of liquor shops, but from what we know of the general discipline on that road we are inclined to regard the expression as a transparent euphemism.

But even a single employé has a right to justice, and one who wishes to drink beer or whisky when off duty will be glad to have the liquor seller champion his cause. He wants the railroad company to show by what right it dictates to him when his time is his own. In this matter the only position for the railroad is the radical one. One of the plainest facts of experience is that a brain disturbed by alcohol on Sunday is unreliable on Monday. Railroad work demands the very best quality of brain work at all times, and the railroad manager is bound to get men, if he can, who will never come on duty except at their best. The wide prevalence of the habit among employés who drink of lying about their condition—of presenting themselves as clearheaded, when in fact their nerves are unstrung, justifies the manager in taking extreme measures to inform himself about the condition of his men. If they will not avow their condition he must learn it as best he can; and he should replace such men by new ones who will be so uniformly sober and keep so uniformly in sober company that he will not feel uneasy about them. The railroad superintendent has a tremendous responsibility. He daily sends out hundreds of passengers in charge of men, any one of whom can, by five seconds' absent-mindedness, plunge those passengers down a bank or kill them in various other ways. His peace of mind is secure only when he has done his utmost to get the best men to be found. Even liquor sellers, when they ride in passengers trains, probably want clearheaded men on the engine.

Drawing precise lines in this matter is impossible. Men may drink to excess, and sooner or later recover their normal condition, but to try to set any rule as to when this recovery is complete is futile. How can the superintendent safely leave the decision of this question to each individual? Again, he must take a radical position, because he must be free from doubt. An engineman carelessly runs past a danger signal. He defends himself by three or four different excuses: he was beguiled into giving too much attention to the gauge cocks because one of them was out of order; he had a green fireman and gave too much thought, at the wrong moment, to the management of the fire; the signal was in a different shadow from what he had ever seen it before; his wife was sick and he lost sleep the night before; he had been overworked in consequence of detention to his train, and so on. Now the fact that he had been drinking too much the day before may have aggravated any one or all these elements enough to make the difference between safety and danger. Generally the fact cannot be proved, but those who have watched the behavior of intoxicated brains hold that the presumptive evidence is strong; and the superintendent has a right to be free from the burden of this doubt. He has the right to be assured that mistakes made under circumstances like those we have enumerated are really due to what people call "human fallibility," and not to that *plus* an outside unfavorable influence voluntarily introduced.

As we have just said, positive proof is generally out of the question, but the best record for absence of accidents to trains and to employés that we ever saw was on a division where the division superintendent took great pains to see that a man who had been drinking to excess *did not go on duty the next day*. The Port Jervis saloon keeper will doubtless bring up the old argument about the meaning of "excess," but the superintendent responsible for the lives of passengers has a right to decide that point for himself. Physicians tell him that alcohol in any quantity disturbs the nerves.

For ourselves, we include this whole matter in a still broader one. A railroad manager should demand perfection in all his men, just as far as he can enforce his demands. A shopman never sees a passenger train, perhaps, and cannot endanger lives if he tries; but the employer needs his best powers and is warranted in hiring only those men whom he can trust to give such service. A passenger brakeman, who is untidy, or whose tobacco-saturated breath befouls half a car, has no just grievance if he is discharged from that place after fair notice. "The right to be hired," which men sometimes fight for, is not his, so far as that kind of a place is concerned. An engineman coming on duty after serious sickness or overwork at home (as in case of domestic affliction) often does his employer an injustice by coming before his brain is just right. The employer is justified in doing what he can to protect himself against such injustice.

Employers are more and more demanding total abstainers in all kinds of delicate work, and railroad work is, in many of its features, the most delicate business that men are now engaged in. The injuries to life and limb resulting from failure to properly perform some delicate function of railroad work, constitute a prominent subject of newspaper discussion every now and then. The true attitude of every railroad on the liquor question is to fight the saloon with more vigor instead of less.

The Chicago Drainage and Ship Canal.

We are pleased to be able to record that work has actually been begun on the canal, concerning which so much has been said and written during the seven years since it was first proposed. Ground was officially broken at Lemont, about 30 miles from Chicago, on Sept. 3, in the presence of about 400 invited guests and a numerous representation from the vicinity. We abstract the following statistics from the address of Mr. L. E. Cooley and others:

This work is being done under a legislative enactment of 1889, which gave the right under certain proper limitations and restrictions to cut a channel through the divide so that the sewage of Chicago can be discharged into the Illinois and Mississippi rivers. This act also provides for the issue of $15,000,000 of 20 year bonds, and the levying of a tax of not over one-half of one per cent. per annum on the assessable property in the district, with the further provision that special assessments may be levied on property especially benefited by the work. The expense of digging the main channel, with the acquirements of the right of way and the payment of railroad damages, is estimated at $22,000,000.

On June 29 contracts were awarded covering a distance of fourteen miles from Willow Springs to Lockport, for the sum of $10,696,734,98. In the meantime the legal department, aided by the finance and engineering committee, has secured through condemnation and purchase at reasonable prices, about 2,600 acres of land, or about four-fifths of the right of way required for this distance. From Willow Springs to Summit, for a distance of six miles, the board has advertised for bids to be opened Oct. 19. From Summit to Ashland avenue the Illinois and Michigan Canal is recommended for adoption. The contracts awarded stipulate that the channel shall be ready by April 30, 1896, and every other contract to be awarded will be made to conform to that time.

The work begun on Sept. 3 is to cover the Chicago divide, 40 miles from Lake Michigan to Lake Joliet, with over 30 miles of channel complete for navigation. The cost will be greater than to extend 14 ft. 280 miles further to the Mississippi. The depth of water in the channel is to be 21 ft. The rock cutting is to be 160 ft. wide at the bottom for 14 miles. The volume of water will give steamboat navigation in the lower river without obstructing locks and dams. Permanent works are required for the gap of 45 miles between Joliet and Utica, but this problem is simpler than that of the Chicago divide.

The policy underlying the law is an open river below Utica to be improved progressively in conjunction with a water supply from Lake Michigan; works above Utica so designed as to permit future increase of capacity, and such a plan for the Chicago divide as will facilitate enlargement to any requirement of water supply from the lakes to the Mississippi—the entire work to be carried out through the co-operation of city, state and nation.

One of the most dramatic railroad disasters that has been reported for a long time occurred on the West Shore road at Haven's Dock near Cranston's, N. Y., on the afternoon of Sept. 5, though the passengers on the train fortunately escaped. The engine of a north bound passenger train was derailed while running at considerable speed and, with the engineer and fireman aboard, went into the Hudson River, falling completely out of sight, the water at that point being very deep. The engineer and fireman were drowned. The first two cars in the train were derailed but did not fall into the water. There are signs on the track of broken running gear for some distance south of the point of derailment, but what it was that broke has not been discovered, as the engine, at this writing, has not yet been raised. On the morning of Sept. 1 the north bound fast mail train of the New York Central & Hudson River ran upon the drawbridge at New Hamburg just as it was being closed after the passage of a small vessel but before it was fully in position, and the train was terribly wrecked. The opening is about 28 ft. wide and the engine landed on the opposite side. The cars were crowded upon it with such force that the wreck did not fall into the water but bridged the stream. The engineer, fireman and one mail clerk were instantly killed. The engineer had applied the brakes before reaching the bridge but he had been running very rapidly, and it seems that he must have paid no heed to either the distant or the home signal. This is the same bridge at which 21 persons were killed by a train accident on Feb. 6, 1871, and there was also a bad accident there on Nov. 7, 1879. If we assume that it is impossible to discipline enginemen and firemen up to a standard where they will not make such awful blunders as this, the question of audible signals at once becomes an important one. All audible signals that have ever been tried are lacking in one important element in that the all-right signal given by them is a negative one (the *absence* of sound means safety), and they have therefore not been enthusiastically favored by the best signal engineers; but when the same drawbridge becomes the scene of three frightful disasters, the company may well consider the advisability of using something besides visual signals, if for nothing more than as a means of quieting the fears of passengers.

The annual report of the British Board of Trade on interlocking and signaling for the last calendar year shows but few marked changes from the previous year. One small company reports that it "has now complied in every respect with the act of 1889," requiring interlocking and the use of the absolute block system, but on most of the roads the progress, though apparently good, is not much greater than we have noticed in previous years. The railroad now open for passenger traffic in the United Kingdom amounts to 19,139 miles, of which 10,909 is double track. About 200 miles of this double track seems to be operated under no space-interval system of any kind, but the remainder is practically all reported as under the absolute block system. Most of the 200 miles is in Ireland. Of the 8,229 miles of single track, about 6,900 miles has the train staff or its equivalent. The percentage of double track road worked on the absolute block system is 98 as against 95 the year before. The change in England and Wales is from 98½ to 99½. Scotland showed 100 per cent. in both years. Ireland has increased from 35 per cent. to 68 per cent. The Great Northern of Ireland had only 14 per cent. blocked in 1890 but reported 68 per cent. at the end of 1891. The other two principal companies in Ireland show good increases. The number of switches, crossings, etc., on passenger lines in the United Kingdom is 40,857, of which 38,123 have the switch and signal levers properly concentrated and 38,323 have them properly interlocked. Of the 25,746 connections with side tracks 23,916 are provided with derailing switches. The percentage of switches, etc., property interlocked is 94 as compared with 92¼ in 1890. In interlocking, England and Wales are in advance of Scotland. The most pronounced advance in interlocking in 1891 is shown by the Barry, the Cambrian, the Festiniog, the Isle of Wight Central, and the Neath & Brecon railroads. The Lancashire & Yorkshire and the Midland report 20 or 30 cases each of short sections of road, varying from 200 ft. to 1,600 ft. in length, on which the company is exempted from establishing the absolute block system. Several companies report their plans for the coming (current) year. The North British intends to put in new or improved signaling arrangements at over 100 places.

Some time ago an English syndicate bought the New York Belting & Packing Co. and capitalized it at about $5,000,000. This syndicate has been anxious to increase its holdings, and if possible control the manufacture of mechanical rubber goods in this country. This does not apply to clothing or rubber shoes. The Cleveland Rubber Co. and the Chicago Rubber Co. have heretofore been practically owned and controlled by Mr. T. K. McClymonds, of Cleveland. The syndicate has now acquired control of these companies, and, it is said, of a company in Akron, O., and Mr. McClymonds has been made General Manager of the consolidation. This does not, however, give the new concern control of the manufacture of mechanical goods. The Boston Belting Co., the largest concern in the country, is not in the combination, neither are the Gutta Percha or the Revere Rubber Companies in it, all of which have a large output. Consumers need not feel any immediate alarm at this new combination, for this product is one extremely difficult to control. New factories spring up too rapidly, and all efforts to control crude or manufactured rubber in the past have been failures. Two years ago the rubber manufacturers of the East agreed to advance the price of goods 10 per cent., but too many concerns dodged the agreement by paying 20 cents for a rubber stamp and stamping invoices as "old contracts."

The International Railroad Congress opened Aug. 20 at St. Petersburg with imposing surroundings. There were about 75 foreign delegates present. M. de Witte, Minister of Internal Communications, opened the Congress with an address. He traced the development of railroads in Russia, where the construction of the first

line was begun in 1836. The system now reaches 32,000 kilometers, and there is in preparation for construction a gigantic railroad across Siberia. The President of the International Commission, M. Belpaire, and the Vice-President, M. Picard, replied in complimentary addresses. General Petroff was made President of the Congress and M. Auguste de Laveleye was elected General Secretary. The Congress was divided into five sections, as follows: (1) Road and structural. (2) Motive power and rolling stock. (3) Operation. (4) Administration. (5) Economical railroads.

The Presidents and Secretaries of these sections were elected from distinguished delegates from various continental countries. England and the United States are not represented among them. A magnificent reception was given to the members of the Congress by the Minister of Internal Communications. On Sunday, the 21st, an excursion was made to the harbor of Cronstadt, and in the evening there was a grand ball and "farandole," whatever that may be.

We publish on another page of this issue a somewhat detailed description of the Chicago Union Transfer Railway Company's proposed belt line, which will be of interest, not only on account of the importance of the project, but also on account of the statistics contained in the committee's report, showing the remarkably rapid growth of the freight traffic in Chicago. This proposed belt line is about 60 miles long and makes a circuit about the city from lake to lake far enough from the thickly settled portions to be reasonably free from street traffic difficulties in the future, and crosses all railroad lines leading to the city.

NEW PUBLICATIONS.

Diaries of Sir Daniel Gooch, Bart, with an introductory notice by Sir Theodore Martin, K. C. B. London: Kegan Paul, French, Trübner & Co.

Barely three years have elapsed since the death of Sir Daniel Gooch—a man to whom first as Locomotive Engineer and afterward as Chairman of Directors, the Great Western Railway of England owed perhaps the heaviest obligations that could bind a railroad system to a single individual. It is only three months, however, since the last great monument of Gooch and Brunel's "theoretical engineering" instinct in the shape of the broad gauge of 7 ft. has been finally abolished on the Great Western line; and the publication of Sir Daniel's "Diaries" somewhat in the form of an autobiography, offers, therefore, a peculiar interest at the present time.

No attempt is of course made to give such a voluminous account of his life as might have been expected from the publication of these diaries in their complete form; and the idea in compiling the book seems to have been quite as much to present an interesting work to the general reader as to trace out for the benefit of engineers the struggles, the hopes and fears, the defeats and successes, of a pioneer in railroad work. And yet the busy railroad man of to-day—whether station agent, president of the road, train despatcher or brakeman—might feel interested in a study on the spot of incidents in the early life of railroads by a busy and energetic worker. Even railroaders are human, sometimes, and like to have their mental food served up in a proper style. This must have been considered reason enough for the insertion by the compilers of tantalizing paragraphs in this book of the following kind "The performances of the narrow-guage trains are narrated in a graphic manner in a passage here omitted."

There is no need to beat a dead horse, and fight over again the battle of the guages; but the railroad engineer must not look to this book for the technical details commonly supposed to crowd out everything else in a locomotive superintendent's diary. A better title for the work would have been simply "Autobiography of a Railroad Pioneer," and so far as concerns a study of the man himself, one could not wish for a more judicious selection of extracts to paint in true colors a career well worthy of imitation in many respects. The principle that guided Sir Daniel through life was, to use his own words, "A steady perserverance in the path of duty to my employers, not being disheartened by a first failure, but ever believing in the possibility of ultimate success, and a determination not to be led into changes by the inducement of immediate advancement." How true he was to this principle of conduct is shown by his long service with the Great Western Railway, extending over a period of fifty years, and by his courage in carrying the Severn Tunnel to completion, as well as bearing a responsible part in laying the Atlantic cables of 1865 and 1866.

As Locomotive Engineer, Sir Daniel Gooch was content (as well he might be) with the fame of designing, so long ago as 1839, the type of broad-guage engine which has continued in use on the Great Western ever since, up to the present summer, when, as stated, the broad gauge system was finally abolished. These engines fifty years ago ran at speeds as high as, if not actually higher than, those now achieved by the narrow gauge type, and to judge from the complaint made by passengers on the Great Western Railway, the latter engines are finding difficulties in the way of keeping correct time that were never met with by the "Lord of the Isles" or other locomotives of the same class. Probably, however, the greatest consideration that would lead one to entitle Sir Daniel Gooch a railroad leader of the first class, was the manner in which he revived by careful management and wise economy the drooping fortunes of the Great Western Railway, and placed the whole system upon the dividend paying basis that it still enjoys. After a successful career he resigned his position as Locomotive Superintendent in 1864; was unanimously requested two years later to become Chairman of the railway, and in 1869, chiefly through his own exertions, was able to announce a substantial dividend.

Great Eastern Railway Co.'s Hotels and Seaside Resorts.—This is an abbreviation of the title of a handsome pamphlet recently issued by the Great Eastern Railway of England, giving a description of the features indicated, together with information about the refreshment rooms and other matters of interest, the whole supplemented by some notes on continental tours. The book is a small one, containing only 55 pages, but is perhaps all the better for this. The number of mis-statements in the average summer resort publication is generally in direct proportion to the voluminousness of the book. The brevity of this handbook and the style of its composition indicate that the compiler intended to make only reliable statements. The book is printed by Sir Joseph Causton & Sons, London, and is worthy of the notice of those who believe that American railroads beat the world in elegant bookmaking. The illustrations, of which there are one or more on nearly every page, are handsome and apparently new. The Great Eastern, like other English roads, owns hotels at several prominent places on its lines. Three are shown in this book. We learn that the waiter's fee at Sandringham Hotel is six cents a meal, the payment of which probably makes the average American traveler feel ashamed of himself. The tariff of the Parkeston Hotel, at Harwich, makes no mention of this 3-penny item, so that travelers may, we presume, pay the usual half dollar. The Great Eastern manages 44 refreshment rooms, of which seven have dining rooms. At these rooms soup is 9d. a plate; bread, cheese and butter, 6d.; coffee, 3d, and gin, 4d. The company furnishes for three shillings (75 cents) a luncheon in a basket which will be delivered on the train to be eaten at leisure. These luncheons consist of chicken or other cold meat, bread, cheese and a small bottle of wine or mineral water. These basket luncheons are, as is well known, a very agreeable feature of English railroad travel, the service being generally quite satisfactory. The comfort which this convenience adds to a journey suggests an unpleasant contrast with the buffet as managed on most American roads, and this contrast is made the more unpleasant by the recollection that an American road (the Boston & Albany) had the lunch basket system in operation for some time a few years ago, but gave it up. Of course, the free and independent American, when he travels, "darns the expense," and must have a dining car or nothing; but it remains true that the dining car is a pretty expensive luxury, and that a good many railroads whose through traffic is not heavy, and a good many trains on even the larger railroads, must get along some other way for a good while yet. The compromise between the dining car and the old fashioned meal-station is the buffet, but it can hardly be said that it is an unqualified success. Perhaps it is to be regarded as a temporary expedient. However, this may be, its chief advantage, which is the fact that it is constantly at the passenger's call, is at present about evenly offset by the lack of variety of food and other deficiencies which one is quite like to encounter at any time after the first meal of any given trip. The disadvantage of the basket system—that one must order his meal in advance (on the Boston & Albany about half an hour's notice was required so as to telegraph the order ahead, is a decided obstacle. But even the dining car demands that the passengers accommodate it, as regards hours, instead of it accommodating them; as, for instance, when a train is two hours late in reaching the way station where the dining car is attached to the train. The Great Eastern restaurants sell tea on the trains and allow the cup and saucer to be left at the next station Possibly they have baskets ready packed, a somewhat doubtful advantage, however.

Journal of the Association of Engineering Societies, July, 1892.—The table of contents of this issue are Settlements of an Embankment of the Boston Main Drainage Works; Lake Currents; Maximum Stresses in Drawbridges; Astronomical Spectroscopy; Discussion on an Enlarged Waterway Between the Great Lakes and the Seaboard and a Memoir of Sophus Haagansen.

American Railway Master Mechanics' Association. The Proceedings of the Twenty-fifth Annual Convention, 1892.

The Secretary of the Master Mechanics' Association, Mr. Angus Sinclair, Temple Court, New York City, issues with his customary promptness the Annual Report. As the convention was held so recently, the papers and discussions, which were reported in the *Railroad Gazette* at the time with more or less fullness, are presumably so fresh in the minds of our readers that it is not worth while to give a list of them here. We may mention, however, what appear to be the most important and interesting reports and discussions. The first is that on compound locomotives. The report is very voluminous, and the discussion is important, varied, and in some parts spicy. Another report of value, particularly when taken with the discussion which follows, is that on tests of steel and iron; and the third, which we would mention particularly, is the report on boilers for high pressure locomotives.

Transactions of the American Society of Civil Engineers, June, 1892.

The June issue of the *Transactions* is a particularly important one. It contains the annual address of President Cohen, giving a history of the construction of the Baltimore & Ohio Railroad. This fills 24 pages of the pamphlet, and of its value our readers can judge, as it was printed in full in two recent numbers of the *Railroad Gazette*. We may say, however, that we consider it a singularly clear and comprehensive essay, considering the necessary limits of space, and it will always stand as a valuable and authoritative historical document. As it appears in the *Transactions*, there are four illustrations which were not given in the *Railroad Gazette*, showing three early locomotives and a passenger car. Besides this address, there is a paper by Mr. William Starling on the Holland Dikes, which, with a very voluminous discussion, fills 141 pages. This is copiously illustrated. The proceedings of the convention at Old Point Comfort are also included.

Illinois Society of Engineers and Surveyors.—Report of the Seventh Annual Meeting. S. A. Bullard, Executive Secretary, Springfield, Ill. Price 50 cents.

The Seventh Annual Meeting of this society was held last January in Chicago, and the eighth will be held next January, from the 25th to 27th, in Springfield, Ill. The report of the seventh meeting contains 10 papers of considerable interest and value, besides discussions on nine topics. It has also reports of standing committees and a list of members. The topical discussion on mud-sills as compared with piles for bridge foundations, is reprinted in this issue. One of the longest papers is on "State Inspection of Bridges," by Mr. E. A. Hill, whose name has been known for years to many of our readers as a railroad officer and a writer on railroad engineering and administration. Mr. Hill sums up the discussions and actions of the various societies which excited considerable interest a year or two ago, and adds some comments of his own. There is also considerable discussion by the members of the Society.

The Compass.—A Monthly Journal for Engineers, Surveyors, Architects, Draughtsmen and Students. Volume 1, 1891-92. Edited by William Cox. New York: Keuffel & Esser Company, 127 Fulton street. Price, $1.75.

This little journal was started in August, 1891. It is devoted to descriptions of engineering, surveying and drafting instruments, to discussions of the principles which underlie the construction and use of such instruments, and describes novelties of greater or less importance and interest as they come up. The volume here collected includes the numbers for one year and has many articles of real value. Among these are articles on the slide rule; on speedy calculators; on a series of numbers with examples of their practical application to scientific purposes, and a new set of gradienter tables with explanations of their use. The subscription price of *The Compass* is now $1.00 a year.

TRADE CATALOGUES.

The Universal Cutter and Reamer Grinder. Brown & Sharpe Manufacturing Co., Providence, R. I.

A new edition of the pamphlet on this machine is just issued. The reading matter has been entirely re-written, and one-third of the cuts are new. The illustrations and descriptions are singularly complete, the machine being shown in full in perspective, and details in line drawings. Copies of the pamphlet are mailed without charge on application to the company.

Ticket Scalpers in England.

The genuine thoroughbred type of ticket scalper is really not known in this country, where for various reasons—climate (!), want of energy, the law-abiding sense of the "great British public," etc., etc.—he does not seem to have established himself at all. The nearest approach to this undesirable parasite would be the chance passenger who might wish to sell the return half of a ticket which he had obtained at reduced fare on the round trip. Since the art of doing this has not yet reached a business basis, the vast majority of passengers will not bother themselves about the monetary saving, but prefer to take a single ticket and have done with it.

If, however, there were well known places or people ready to take advantage of cheap return tickets, without doubt English passengers would soon learn which turning of the road led to them. As it is, they simply don't bounce the railways because the trouble is greater than the possible profit; they are moral from the lack of means to be immoral.

Besides, think of the "awful warning" conveyed to passengers when they see plastered up in every station a large size poster detailing the particulars of police court procedure! Here, for instance, is a verbatim copy of a bill to be seen at all the London, Brighton & South Coast stations:

CAUTION.

Four persons were charged at the Brighton Borough Bench, on Thursday, Sept. 3, with having sold the return halves of excursion tickets in order to enable other persons to travel

therewith, and being convicted thereof, were fined certain penalties and costs. Three other persons at the same court were charged with purchasing such halves of return tickets, and attempting to travel therewith, and being convicted thereof were also fined certain penalties and costs. The company hereby give notice that any person or persons found selling or attempting to sell, or parting or attempting to part with the return halves of any return tickets, or any person or persons purchasing the same, or traveling or attemping to travel therewith, shall be proceeded against in like manner.

By order.

Truly a terrible sounding document; this, with enough legal form and ceremony about it to make one take the oath at once. But what will American railroad managers think of England as a paradise of of "railroadocracy," when powers of this kind are available against evildoers?

It is pretty evident now that the British public has not many chances of going astray on the question of tickets; and even where it can do so, the penalties are tolerably heavy, too much so at any rate to make the game worth the candle. F. B. L.

The Austin Dump Wagon.

The accompanying picture illustrates a dump wagon, manufactured by the F. C. Austin Mfg. Co., of Chicago, Ill., which is claimed to possess all desirable features. It is easily and quickly dumped, is strongly made, and can be turned short. Contractors generally figure that for a haul of 50 to 75 ft. or less drag scrapers are best

The Austin Dump Wagon.

employed; over that distance, up to, say, 300 ft., wheel scrapers, and for a longer haul, wagons. But the Austin Co. call attention to the fact that, when loaded by the New Era Grader, wagons will, for any distance above 50 ft., move earth more cheaply than wheel scrapers or any other method. If the plow of the New Era cuts 8 in. deep (under favorable circumstances it will cut 12 in. deep) every foot of driving elevates and loads two-thirds of a foot, and 60 ft. of driving loads a wagon of 1½ yards. The speed of teams at heavy work is 150 ft. a minute, and the New Era will load 2½ wagons a minute, which makes the cost of loading less than 2c. per cu. yd. By actual test the New Era Grader has loaded 150 wagons an hour for several hours.

TECHNICAL.

Manufacturing and Business.

The Joseph Dixon Crucible Co. is making a graphited oil, which, it is claimed, will tend to prevent the formation of rust and the adherence of scale on the interior of steam boilers. Experiments that have been made seem to confirm the claim that scale does not adhere to the parts that have been coated with this mixture.

The Foster Engineering Co., makers of valves, pressure regulators, etc., have largely increased facilities for manufacture in their new shops at Newark, N. J. At the recent election of officers Mr. J. M. Foster was chosen President and General Manager; Mr. J. S. Mundy, Vice-President, and Mr. J. Newton Baker, Secretary.

The new Reading passenger station at Twelfth and Market streets, Philadelphia, is to be equipped with 31 patent safety hydraulic elevators furnished by Stokes & Parrish, of Philadelphia. Fifteen of them are for freight and six for passengers.

The Berlin Iron Bridge Co. has taken the contract for constructing the iron roof of two buildings, one 66 × 72 ft. and the other 32 × 75 ft., for the Elmira Electric Illuminating Co., Elmira, N. Y.

Mr. C. M. Fuller, who has for many years traveled in the Southern States selling railroad supplies, now represents the Burrows Car Shade Co., of Portland, Me.

The Secretary of State of Illinois has issued licenses of incorporation to the following companies: The Clark Car Coupler Co., Chicago; capital stock, $500,000; incorporators, James J. Flanigan, A. J. Moore, and John M. Young. The Street Railway Gazette Co., Chicago; capital stock, $25,000; incorporators, Michael J. Sullivan, Edward T. Seixas, Matthew C. Sullivan, and William H. Fitzgerald.

At the annual meeting of the Pittsburgh Forge & Iron Co., Calvin Wells was re-elected President and Treasurer and F. E. Richardson Secretary.

The Vulcan Iron Works, Wilkes Barre, Pa., is building a boiler shop 80 × 150 ft., and the blacksmith shop will be increased 50 × 100 ft.., and the foundry extended 50 ft.

The Field Feed-water Purifier Co. within the last month has equipped the new plants of the Armour Packing Co. and the National Linseed Oil Co., at Kansas City, also the new Electric Light & Power Co. plant at Rockford, Ill., and has filled orders for the Chicago & Alton railroad. The Wisconsin Central, since the beginning of the year, has equipped 12 locomotives. Several of these purifiers have been supplied for marine boilers.

The United States Pipe Line Co., of Bradford, McKean county, with a capital stock of $600,000, has been incorporated in Pennsylvania. This is the pipe line established by the producers in opposition to the Standard Oil Co. It will run from Oil City to Bradford.

Plans have been completed for the proposed new shops of the Gould Car Coupler Co. at Depew, near Buffalo, and it is expected that the shops will be in running order by Nov. 15. The site for the shops will cover an area of 15 acres. There will be eight main buildings of brick with iron roofs, all fire-proof. These buildings are the foundry, 80 × 300 ft.; the annealing room, 110 × 216 ft.; the core room, 80 × 125 ft.; the engine and boiler room, 60 × 104 ft.; the tumbler house, 80 × 125 ft.; the grinding and fitting house, 80 × 125 ft., and the office, 60 × 80 ft. The foundry will be equipped with a traveling crane running on a track the whole length of the room. The plans for the shops have been drawn so as to admit of any changes which the increase of business may demand. When the shops are completed it is expected that the daily output will be 200 freight and 50 passenger couplers with platforms and vestibules. The works at the beginning will probably employ about 400 men. W. R. Haven, of Buffalo, has received the contract for erecting the shops.

New Stations and Shops.

The Board of Aldermen of the city of Lowell, Mass., has agreed to the plans presented by the Boston & Maine for a new passenger station in that city, and will withdraw its petition for a special commission to decide the questions concerning location, etc. It is proposed to build the new station on the present site of the Middlesex Street station.

Work has begun on the foundations for the addition at Market and Merrick streets to the Pennsylvania Railroad Broad Street Station, Philadelphia. The contract for the foundations was let for $100,000.

The Philadelphia & Reading has awarded the contract for the erection of a covered wharf at pier 25 South Wharves, Philadelphia, and for the dredging out of the channel.

The St. Louis & San Francisco has let a contract for building a new station at Springfield, Mo., to cost about $30,000.

The Chicago, St. Paul, Minneapolis & Omaha has begun work on the foundations of two passenger stations—one at Hudson, Wis., and the other at Sioux Falls, S. D. The station at Hudson will be a frame structure 58 × 25 ft., with a baggage and express annex 30 × 20 ft. The Sioux Falls station will be similar in design, 58 × 22 ft. with baggage room 20 × 15 ft.

The Chicago, St. Paul, Minneapolis & Omaha is altering and enlarging the St. Paul freight house. A track formerly extended into the building. This has been removed to the south side of the building and openings cut through the walls for handling freight. The addition will be 102 × 52 ft., and like the present building, will be of brick trimmed with stone. All of the openings on the track side will be equipped with the Wilson rolling steel shutters.

The new machine shops and roundhouse of the Norfolk & Western at Lambert's Point, near Norfolk, have been completed, and are now in operation. The shops are the largest on the line, and the roundhouse has capacity for 26 engines. These shops have been provided with machinery of the latest patterns. The new warehouses of the company are also advancing rapidly toward completion.

The Baltimore & Ohio, the West Virginia & Pittsburgh and the Monongahela River roads will erect a handsome union station at Clarksburg, W. Va.

The Western Society of Engineers.

This society indulged in a "summer outing" on Thursday of last week, the principal objective point being the World's Fair grounds. The party was taken to Jackson Park in a train provided by the Baltimore & Ohio Railroad, and after inspecting the buildings and grounds assembled in the Mines Building for lunch. This proved to be a long affair, as the caterer's equipment arrived late and in several sections, and speeches and lunch were necessarily served in alternate courses. President Randolph delivered the address of welcome, and with Chief of Transportation Exhibits, W. A. Smith, as toastmaster, the following toasts were responded to: "Christopher Columbus," T. B. Bryan; "The Architects of Chicago," W. L. B. Jenney; "The Electricians of Chicago," F. de Land; "The Wife of the Engineer," W. Sooy Smith; "The Engineer's Sweetheart," W. L. Stebbins; "The Western Society of Engineers," I. O. Baker.

Car Lighting.

All the new Pullman sleeping cars which are being built for the Union Pacific will be illuminated with Pintsch gas. The oil lighting equipment of the cars running over the Union Pacific lines is being taken out, and Pintsch gas equipment supplied in its place.

Plans have been forwarded for the construction of a Pintsch gas plant at Oakland, Cal., and arrangements are being made for the erection of another plant at Portland, Or.

The Pintsch gas plants at Kansas City and Council Bluffs will be in running order in four or five weeks, and the supply already at St. Louis, Chicago, Denver and Ogden will provide this light for most of the principal railroads of the West.

Air-Brake Trials.

As we go to press, comparative trials of the Westinghouse and the New York airbrakes are being made on the New York Central near West Albany, N. Y. On Thursday standing tests were to be made, and on Friday running tests. Mr. P. H. Dudley has charge of these tests, and we are informed that very elaborate preparations have been made to get more data than has been secured in any tests heretofore made.

Electric Cars for the Liverpool Overhead Railroad.

The *Railway World* (London) in an account of the car shops of Brown, Marshalls & Co., of Birmingham, prints the following description of a 45-ft. passenger car, with an electric motor, now building at those shops for the above named road.

"Each train to run upon the new line will consist of two cars coupled together, and mounted respectively on two four-wheeled bogie trucks of the ordinary American pattern. Upon the truck at each end of the train will be fixed an electric motor of sufficient power (70 to 100 h. p.) to propel the train; but the rearward motor for the time being will alone be in action. The car bodies are 45 ft. in length and 8 ft. 6 in. wide, the centres of the trucks being 32 ft. apart. The truck frames are of pressed steel, and solid wheels, 2 ft. 9 in. diameter, are employed, with wrought iron spokes and naves and steel tires. The buffers are placed centrally, as in all American rolling stock, combined with a self-acting car coupler. The motor axle boxes are of cast steel. The car bodies are framed of oak and teak, with side doors, and are separated into two classes only, first and second. The internal lining of the former is of wainscot oak with black walnut banding while the second-class compartments are lined with yellow pine. The cars are lighted with electricity and are efficiently braked by a mechanical screw brake to every wheel, in addition to the Westinghouse automatic. Each car holds 56 persons; and at one end, immediately above the electric motor, is placed a very neat little cab for the "motoneer," with electric regulating switchboard, brakes, etc., close at hand, so that everything is under control."

The Richard Peck.

The new boat for the New Haven Steamboat Co., named the Richard Peck, and which is to ply between New York and New Haven, had a trial trip on the Delaware River last week. The vessel is a twin screw propeller, 309 ft. long on the water line and 316 ft. over all. It has a breadth of beam on the hull of 48 feet; breadth over guards, 62 ft; 18½ ft. depth of hold, 10½ ft. draft, 2,300 tons displacement, and 2,906 tons gross tonnage. The engine equipment consists of six steel Scotch boilers and two triple expansion engines with surface condensers. The cylinder diameters are 24 in., 38 in. and 60 in. with a common stroke of 30 in., and a rated horse-power of 4,000. The boat is lighted throughout by electricity, the machinery for which consists of two dynamos and two straight line engines, the united capacity being 505 incandescent lamps and a search light of 6,000 candles brilliancy. The saloon is handsomely decorated in salmon and cream tints. There are 110 staterooms for first class passengers and 200 open berths for the crew and others, the latter being located on the lower deck. On the trial trip the vessel developed a speed of 20¼ miles an hour over a measured course.

Double-Deck Ferry Service.

The upper decks of the new Pennsylvania ferryboats are now being used for receiving and discharging passengers. The connecting bridges and gangways are completed and in operation at the Jersey City depot and at the Cortlandt street ferry in this city. The delay in completing the work is due to non-arrival of material and to the fact that the last double-deck boat, the "Washington," was not finished at the time expected. For the present this system will be operated only

at Cortlandt street, as the crossing of West street at that point is more dangerous and the travel greater than at Desbrosses street. The new bridges are level with the upper decks of the boats at mean tide. A gangway 19 ft. long and 7 ft. wide is hinged to the bridge at one end and supported at the other by chains from an overhead shaft. This shaft is connected by a worm gear to a vertical shaft extending to the main bridge below, enabling the gangway to be raised and lowered. At the outer end of the gangway there is an apron or short gangway operated by a compensating lever, to make a nice connection to the deck of the boat. As the rise and fall of the tide is about five feet the gangway cannot have a maximum inclination of more than 2½ ft. in its entire length on ordinary tides.

The Barr Vestibule.

The Drexel Railway Supply Co. is now manufacturing and selling the Barr vestibule, patented by J. N. Barr, Superintendent of Motive Power of the Chicago, Milwaukee & St. Paul. This vestibule has been in use on the Cincinnati, New Orleans & Texas Pacific; Canadian Pacific; Chesapeake & Ohio; Chicago, Milwaukee & St. Paul; Minneapolis, St. Paul & Sault Ste., Marie., and other roads. It has recently been modified.

The Broadway Cable Road.

In the construction of the Battery loop of the Broadway Cable Railroad a difficulty has been met in front of the Produce Exchange, where the contractors are now at work. At this point three pipes are in the way, a 12-in. and a 16-in. water main, and a 20-in. gas main. These pipes lie directly in the way of the excavation, and about 2 ft. below the surface. The smaller main will be moved nearer the curb, and the larger shifted toward the centre of the street, so that the excavation can be made between them. The treatment of the gas main has not been decided upon; it crosses the line of the proposed tracks about 18 in. below the surface. No serious delay is expected from this source, however.

The Lawrence Scientific School.

Our account of the organization of the department of civil engineering of the Lawrence Scientific School at Harvard University, as published Aug. 26, was slightly misleading in one particular. From that notice it would appear that the course in electrical engineering is rather incidental and not thoroughly organized. As a matter of fact, this is a fully developed four years' course. This, and in fact the entire department of engineering instruction, is under the charge of Prof. Burr, as was said in that issue. Incidentally, it may be well to say that Prof. Burr does not give up his practice as a consulting engineer. The University takes a liberal view of this matter, and recognizes that for several reasons it is advantageous for the University that the head of this department should be an active practicing engineer, a principle which has been recognized as a good one in other places than in colleges.

Interlocking.

The National Switch & Signal Co. has lately made contracts for the erection of interlocking machines in the West as follows: A twelve lever machine at Minnetonka and a twelve lever machine at Camp Douglas, on the Chicago, Milwaukee & St. Paul; a twenty-four lever machine at Seventy-first street, Chicago; one at La Paz Junction, with which the Fontaine crossing will be used; one machine at Millford Junction crossing, one at Welker Crossing, and two at Mount Vernon for the Baltimore & Ohio; a sixteen-lever machine at Centreburg, O., on the Cleveland, Akron & Columbus, and a twelve-lever machine at East Superior for the Chicago, St. Paul, Minneapolis & Omaha; a sixteen-lever machine at Kenton, O., on the Chicago & Erie; one 72-lever frame at Forty-third street, Chicago, for the Illinois Central, and a 76-lever frame at Twelfth street for the same company.

The Pennsylvnaia Raiload Work at Elizabeth.

A force of workmen is engaged in framing the trestle for the elevation of the Pennsylvania tracks at Elizabeth, N. J. A temporary yard has been established at Murray and Union streets, where the work will be carried on. The work on the erection of the trestle will not be commenced for some weeks yet.

THE SCRAP HEAP.

Purdue University.

The annual register of Purdue University, at Lafayette, Ind., has just been issued and gives, like nearly all publications of its kind, a somewhat elaborate account of the several courses of study, the equipment, expenses, etc. Purdue University, it may not be amiss to say here, is the Indiana State Institute of Technology. Its purpose is to afford young men as well as young women an opportunity to acquire a good collegiate education in mathematics, science, literature and art, and, at the same time, to secure instruction and practice in such lines of work as will fit them to engage in practical industries. The instruction is both theoretical and practical. Being, as stated, a state institution, the instruction in the university is free to all students of Indiana of suitable age and qualifications. Small laboratory, library and incidental fees only are charged. Non-resident students, however, we understand, will hereafter be charged $100 per annum. The institution embraces six special schools, viz., schools of mechanical, civil and electrical engineering; a school of agriculture; a school of science; and one of pharmacy. Besides these, there is a preparatory department. The register contains, besides the matter already indicated, illustrations of the several university buildings, showing disposition of apparatus, etc., faculty and student lists, and miscellaneous information.

Railroad Taxes in West Virginia.

The State Board of Public Works of West Virginia has finished assessing the railroads of that state, and the report shows a grand total of $18,549,346. There are 34 operated lines in the state. The Baltimore & Ohio is assessed at $6,996,568, Norfolk & Western (in course of construction), $1,191,211, and the Ohio River, $1,444,444.

One More Elevated Road for Chicago.

The Secretary of State at Springfield, Ill., on Sept. 3, incorporated the Chicago Merchants' Elevated Railway Co., of Chicago. The capital stock is $5,000,000, and the incorporators are Samuel A. Craig, E. F. Thompson, Royal F. Wilds and others.

Fines for Smoke Nuisances.

In Chicago, Sept. 1, Justice Glennon heard a number of continued "smoke nuisance cases." Twenty-one cases against the Illinois Central Railroad Co. were disposed of by the court by the imposition of a $25 fine on each charge. The company's attorney stated that all precaution had been taken since the suits were brought, by the use of smoke-consuming devices on locomotives, and asked for a stay of proceedings for a short time in order to give the consumers a test. Justice Glennon would not grant a continuance, however. He said just about a year ago he had granted a similar request, and the difficulty was never completely repaired, consequently he was not in favor of any further extenuation. A number of cases against individuals were dismissed upon the payment of costs, $3.

Canada's Mineral Wealth.

According to the annual report of the Mineral Statistics Division of the Geological Survey Department, Canada, just published, the output for the year 1891, reached $20,000,000, an increase of $5,000,000 in four years. As compared with 1887 the output of copper increased from $342,345 to $1,238,780; asbestos, from $226,975 to $1,000,000; coal, from $4,758,590 to $7,792,175; petroleum, from $595,868 to $1,004,546; pig iron from $366,191 to $368,901; pyrites, from $171,194 to $196,086; silver from $349,330 to $407,183 The output of nickel was valued at $2,775,976 in 1891, against nothing mined in 1887. The production of the gold mines show a decline from $1,178,637 to $925,486 as compared with 1887. The asbestos mines near Thedford, Danville and Coleraine, in the Quebec district, now employ over 1,000 men, while the export has grown from $158,929 in 1887 to $528,530 in 1890, and the production from $24,700 in 1880 to $1,000,000 eleven years later. In gold Canada is not doing as well as formerly. Nova Scotia, which has since 1862 produced about $10,000,000 worth, in 1890 only showed a product of $474,000. British Columbia, which has altogether given the world $55,000,000, produced in the same year only $494,000, as compared with $4,000,000 in 1863. Nickel mining is growing in volume, and three large companies with headquarters respectively at Montreal, Swansea, England, and Cleveland, U. S., with a host of minor ones, are now actively engaged in production and smelting at Sudbury and the surrounding district. Other important discoveries of nickel are reported from near Port Arthur, Ont., and St. Stephens, N. B., and a company is being started in Toronto with a view to establishing smelting works there. There are 12 oil refineries now in operation at Petrolea, and the large production of Canadian petroleum, 190,000,000 gallons between 1881 and 1888, is likely to be increased by recent discoveries in the McKenzie basin.

LOCOMOTIVE BUILDING.

The Baldwin Locomotive Works received orders last week for 10 compound consolidation engines for the Lehigh Valley with 54-in. driving wheels and 66-in. boilers, and for two compound and two simple consolidation engines for the Toledo, Ann Arbor & North Michigan.

The Chicago & South Side (Elevated) Railroad, of Chicago, has ordered from the Baldwin Locomotive Works 25 compound Forney locomotives, precisely like the 20 now running on the road and which were built at the Baldwin shops. These engines were recently described in the *Railroad Gazette*.

The compound passenger locomotive built by the Baldwin Locomotive Works for the Pennsylvania was delivered to the road last week. It is No. 1,510, and is the 235th compound locomotive turned out from these works. The Baldwin works are now delivering to the Baltimore & Ohio the 10 fast passenger engines ordered by that road.

CAR BUILDING.

The Des Moines, Northern & Western has ordered two passenger coaches from the Ohio Falls Car Co.

The J. G. Brill Co., of Philadelphia, has a contract to build 62 cars for the cable lines of the City Passenger Railway, of Baltimore.

The Gilbert Car Co., of Troy, N. Y., is building four cars arranged similar to baggage cars for the Albany Street Railway Co., and is also building for the same road 15 street cars of the usual type.

The Madison Car Works have orders for 100 fruit cars, 10 box cars and 10 coal cars for the Illinois Central, 100 box cars for the Kansas City, Ft. Scott & Memphis, and 250 fruit cars for the South Florida Railroad.

Mr. Barney, of the Barney & Smith Manufacturing Co. of Dayton, O., has been in Seattle, Wash., lately, to see about the cost of erecting shops there in which to build 8,000 freight cars for the Great Northern road.

The Chicago, St. Paul, Minneapolis & Omaha has received from the Pullman company 15 passenger and 2 combination baggage and passenger cars. There are 5 more coaches to be delivered. The equipment of these coaches includes the system of steam heat adopted by the Northwestern Line, Pintsch gas and Forney seats from the Scarritt Furniture Co.

The Chicago & South Side Rapid Transit, of Chicago, has ordered 120 passenger cars. Seventy-five are ordered from the Gilbert Car Mfg. Co., of Troy and 45 from the Jackson & Sharp Co., of Wilmington. This equipment is exactly like that first put on the road and has the Westinghouse automatic air brake, the Vauclain wrought iron truck wheels, Pintsch gas light and other modern improvements.

The Pennsylvania has placed in service on its New York & Chicago Limited Express trains in the last few weeks nine sleeping cars built for the service by Pullman's Palace Car Co. The cost of the cars is given as $30,000 each. The upholstery is in gold colored haircloth, and all of the metal work is heavily gold mounted. The drawing rooms are richly furnished in white with gold trimmings, and maroon colored damask plush.

BRIDGE BUILDING.

Alton, Ill.—The New Jersey Steel & Iron Co. is reported to have the contract for the superstructure of the new bridge over the Mississippi River, at Alton. Work on the foundations was begun in the spring and about 300 men are now employed on the work.

Aurora, Ill.—The Chicago, Burlington & Quincy will build a viaduct over its tracks at Spring street, Aurora.

Bayonne, N. J.—The following bids for building a bridge over the tracks of the Central of New Jersey were received by Board of Chosen Freeholders, Jersey City, N. J.: Frank C. O'Riley, Orange, N. J., $56,500; John M. Shannon, Jersey City, $64,800; Wallis Iron Works, Jersey City, $48,000.

Berkeley County, W. Va.—The County Court of Berkeley County, W. Va., has appropriated $2,000 for the erection of a bridge over Back Creek on the Parks Gap Road in that county.

Brantford, Ont.—Engineer Carey, of the Toronto, Hamilton & Buffalo, is surveying for the proposed bridge over the Grand River. Tenders for the construction of the bridge were asked some time ago, and are due to be opened this week.

Columbia River.—The Great Northern has let the contract for the steel superstructure of the bridge across the Columbia River to the Edge Moor Bridge Works, of Wilmington, Del. This bridge will consist of two spans, one 416½ ft. and the other 250 ft. long. The central pier will be built on a small rocky island. All masonry will be of granite and will be built by the railroad company. The water under the long span is 160 ft. deep. The total cost of the structure will be, it is estimated, $120,000.

Coon Creek, Minn.—The Great Northern will build a 40 ft. plate girder bridge across Coon Creek.

Crookston, Minn.—The steel superstructure of the Great Northern bridge is ready for shipment from the shops, and the work of erection will be begun about Sept. 20.

Cumberland, Md.—The Baltimore & Ohio Railroad Company has prepared plans for a new steel bridge, double track, single span, 100 ft. in length, to take the place of the wooden structure now spanning Evitt's creek east of Cumberland, Md. The bridge now used was built in 1841. The grade will be raised 6 ft.

Capt. D. McCauley, of Jersey City, is removing the old bridge of the Georges Creek railway on North Mechanic street. The steel for the superstructure for the new bridge has been delivered. It will be a double track bridge 100 ft. in length and was built by the Patton Steel Co.

The work of renewing the long trestle of the West Virginia Central & Pittsburgh Railroad across the meadows at Cumberland has been commenced and is being pushed rapidly. This trestle is 1,500 ft. in length, varying from 5 to 40 ft. in height, and the new structure will be built entirely of steel, with stone foundations.

Fairmont, W. Va.—The Baltimore & Ohio has contracted with Dorsey Bros. to build a single span arch stone bridge over Coal Run.

Falcon, Ont.—The new Canadian Pacific bridge over the Gull River at Falcon, east of Rat Portage, will have two 30-ft. stone arches and one iron span 130 ft. long. The bridge will be constructed for a double track. W. G. Reid is the contractor.

Gatineau, Que.—A local capitalist has offered to provide the $20,000 needed to insure the construction of the bridge at this point, provided it is made a toll bridge. The amount above, with the $25,000 already granted in bonuses by the various municipalities, would be equal to the estimated cost of the bridge.

Hampton, Ky.—The Chesapeake & Ohio Railroad Co. has prepared plans for a new bridge over the Big Sandy River, between Kentucky and West Virginia, starting at the upper end of Hampton City. This will make it possible to do away with the long trestle approach on the Kentucky side. Land has been purchased for the approaches and to accommodate the change in the roadbed necessary to reach the new structure.

Harper's Ferry & Loudon.—This company has let the contract for a new iron bridge to be erected over the Shenandoah River at Harper's Ferry to the Vulcan Road & Bridge Co., of Charleston, W. Va. The bridge is to be of four spans, of 152 ft. each. The contract calls for the completion of the bridge by the first of December.

Jersey City, N. J.—The Pennsylvania Railroad is about to construct a new bridge across the Hackensack River, just south of its present bridge, to accommodate travel over the Newark cut-off. The bridge will be about 1,000 ft. in length and have a double track at an elevation of about 30 ft. above mean tide. The greater part of the superstructure will be of wood except the draw span, which will be of iron and steel. The cost will be about $150,000. It is expected to have the superstructure completed before cold weather sets in, but the draw will not be built until navigation of the river is closed by ice.

Little Round House, Minn.—The Great Northern has let the contract for a 40 ft. arch culvert to Ring & Tobin, of Minneapolis. Kettle River sandstone will be used.

Mineral County, W. Va.—The County Court of Mineral County has advertised for bids for the erection of an iron bridge over Patterson's Creek at Barkville in that county.

Minneapolis, Minn.—The Great Northern is receiving bids for excavating 120,000 yds. of material for the East Minneapolis track lowering. Under the agreement with the city the railroad company excavates and loads the material and the city removes it. The railroad company builds all retaining walls and the following steel highway bridges: Second avenue, N. E., 30 ft. long; Second street, N. E., 45 ft. long; University avenue, 80 ft. long; Fourth street, N. E., 80 ft. long; Fifth street, N. E., 220 ft. long; Seventh street, N. E., 140 ft. long; Central avenue, 200 ft. long; Twenty fourth avenue, N. E., 94 ft. long; Broadway, 115 ft. long; Central avenue at intersection of Broadway, 218 ft. long. All the bridges under 95 ft. long are to be plate girder, and with two exceptions, will carry 36-ft. roadways and two sidewalks, each 6 ft. wide. The roadways of the Central avenue and Main street bridges will be 51 ft. and 56 ft. respectively. The city will build, under the agreement, a highway bridge at Nicollet street, Nicollet Island. Some of the property owners are objecting to the construction of this bridge, but it is not at all probable that it will be abandoned.

The railroad company is also to construct viaducts at Como avenue and Tenth avenue, S. E. All of this work is to be completed before June 15, 1893. The estimate of the City engineer for bridges for 1893 is as follows:

Widening of stone arch	$30,870
Thirty-first avenue, S., undercrossing	11,926
Lake street over C., M. & St. P.	24,113
Western avenue, over Bassett's Creek	3[illegible]000
City's portion for Lake street, over St. Louis park road	2,500
Second street, over G. Northern tracks	3,500
Nicollet street	6,095
Seventh street, near Central Market	58,000
Repairs	15,000
	$155,034

Montreal.—The plans for the Wellington street bridge are nearly complete, and tenders for the steel superstructure will be called for soon. It is the intention of the government to have the piers for carrying the bridge built by days' work under the supervision of officers of the Department of Railways and Canals.

Providence, R. I.—Proposals are wanted until Sept. 29 for constructing an iron highway bridge at the site of the old Washington bridge over the Providence River. Robert E. Smith is Commissioner of Public Works.

Rice Creek.—The iron plate girder bridge which the Great Northern will build at this point will be 100 ft. long, consisting of one 40 ft. span, and approaches 30 ft. each.

Ritchie County, W. Va.—The County Court of Ritchie County, W. Va., has asked for bids for the erection of two bridges in that county. One is to span the north fork of Hughes River, near the south of Gillespie's run, of steel or iron, 140 ft. in length. The abutments are to be 23 ft. high from the bed of the river, and 24 ft. wide at the bottom. The other bridge is to span the river at the E. R. Taylor bridge site, and is to be a similar bridge 180 ft. long, with a 10 ft. roadway, 40 ft. above the bed of the river.

St. Cloud, Minn.—The Edge Moor Bridge Works have completed the erection of one span of the Great Northern's steel bridge across the Mississippi River, and have the second nearly completed.

Westminster, B. C.—Tenders are invited for the construction of a bridge across the east channel of the Squamish River, opposite Hall's Point.

Wheeling, W. Va.—The Wheeling & Belmont Bridge Co., which owns and operates two bridges connecting the city of Wheeling with Bridgeport and with Wheeling Island, will build a new steel bridge between Wheeling Island and Bridgeport over the back river channel of the Ohio River. This channel is now spanned by a wooden bridge about 900 ft. long, supported by stone piers 150 ft. apart. The new bridge will be 40 ft. wide and will have three driveways and two sidewalks. It will be built upon the present piers. The Wheeling & Belmont Bridge Co. is entirely out of debt, having liquidated its obligations last year and declared a semi-annual dividend of 4 per cent., payable July 1.

The stone arch bridge over Wheeling Creek at Main street, Wheeling, has at last been completed, after more than two years' work. This bridge was illustrated and described in the *Railroad Gazette* of Aug. 15, 1890. It is one of the famous structures in this country and in the world, in fact, being a single span 158 ft. in length. It was opened for traffic last Saturday.

Wilmington, Del.—The Delaware Construction Co. has been awarded the contract for the new steel bridge to be built over the Brandywine at Washington street, at a cost of $79,000. The bridge is to be finished by Dec. 15 next. It is to be 793 ft. long and 60 ft. wide. There were 18 bidders, the Elmira Bridge Co. being the highest at $99,945, and the Delaware Construction Co. the lowest, $79,000.

RAILROAD LAW—NOTES OF DECISIONS.

Carriage of Goods and Injuries to Property.

In Mississippi a shipper agreed to ship an ass and four mules over appellant's line in a box car if the doorway thereto was slatted and not closed. As the train was leaving he signed a special contract containing this clause. "And the said party of the second part, having examined the same, hereby accepts for such transportation the cars provided, . . . and assumes all risk . . . in consequence of suffocating or other ill effects of being crowded in the cars." The car doors were not slatted, and the jack died from suffocation in consequence thereof. The Supreme Court rules that the acceptance of the box car by the shipper went no further than the acceptance of one with an open door properly slatted, and that suffocation for want of ventilation was not one of the risks assumed when the shipper signed the contract.[1]

In Colorado, in an action against a railroad to recover the value of an express package, it appeared that the express car, with three others, was blown from the track by a gale into such a position that all the goods must have been thrown into one corner at the top, that the car was immediately set on fire by coals from the stove, and burned so rapidly that the messenger escaped with difficulty; and that the wind was so fierce as to make it almost impossible to stand or walk, and the air so full of dust that one could scarcely see. The Supreme Court holds this sufficient evidence to support a finding that the proximate cause was the "act of God," and not the failure of the company to remove the goods after the car was overturned.[2]

The Supreme Court of Texas rules that under the statute imposing a penalty on common carriers for refusing to give, when it is demanded, a bill of lading stating "the quantity, character and condition of the goods" received for transportation, the railroad company incurs the penalty by giving a bill of lading for lumber describing it as "a car load" only, when the shipper demands that the weight be stated.[3]

In Indiana the Supreme Court rules that a contract of shipment is not rendered illegal by the single fact that the carrier gives the shipper a special rate, to be carried into effect by means of a rebate; and in order to defeat the shipper's action for the rebate the carrier must show that the special rate is an unjust, unfair, or oppressive discrimination in favor of the shipper against the general public.[4]

In New York, the Court of Appeals lays it down that the easements of light, air and access which an abutting owner has in a street have no value apart from the abutting property; and where they are taken by the construction and maintenance of an elevated road in the street their value is to be measured by the injury which such taking inflicts on the abutting property, and with reference to the agency by which they are taken; and where it appears that the construction and operation of the road has benefited the abutting property and increased its value, which would not have been so great except for the building of the road, or where it appears that the road has not prevented the natural increase in value, the abutting owner has received no damage, and there can be no recovery. The fact that the increase is common to all the property in the street, and greater in proportion to property on the side streets than that on which the road is constructed, is not material.[5]

The Supreme Court of Pennsylvania rules that a release to a railroad of a right of way, in which the company is discharged also from all damages incurred, or to be incurred, by the location, construction; or operation of the road does not cover injuries resulting from the negligence of the company in constructing or operating the road.[6]

In India the Supreme Court rules that where a railroad constructs its road upon a highway, and erects embankments along the side, obstructing the view and impairing the usefulness of the highway, contrary to the statute, and an engineer, approaching at an unusual hour, fails to give the statutory signals in time to enable a person driving along the road to take his horses to a safe distance, and the horses become frightened and run away, the driver's failure to stop and listen, although he knew the horses were afraid of the cars, is not negligence.[7]

In New Jersey the Supreme Court decrees that where a railroad by building a high embankment on its right of way, forces the earth into an adjoining lot under the surface thereof, and thereby injures a building erected on the lot, it cannot, in an action for damages, justify on the ground that its charter authorized it to construct its railroad, and that the embankment was constructed with reasonable care and prudence, since the injury is not of the class of incidental injuries, unavoidable in the operation of a railroad, which are deemed *damnum absque injuria*, but is a direct invasion of private property.[8]

Injuries to Passengers, Employees and Strangers.

In Pennsylvania the defendent used a railroad track in connection with his coke furnace which track forms the arc of a circle, and is crossed twice by the track of a common carrier railroad, which subtends the arc as a chord. By the negligence of defendent's engineer, one of his engines on the furnace track collided with a passenger train on the carrier track. Defendent's engineer, just before the collision, reversed his engine, shut off the steam and jumped to the ground. By the jar of the collision, the throttle on defendent's engine was reopened, and it started backward around the track, and again came into collision with the passenger train on the second crossing, where it had been stopped. The Supreme Court rules that a passenger injured in the second collision may recover damages from the defendent.[9]

The Supreme Court of Arkansas holds that a notice of a railroad company forbidding persons who have no business with the company to enter any of its cars does not apply to any person who enters for the purpose of assisting a lady to a seat. A person who enters a car for the purpose of assisting a lady to her seat, cannot recover for being thrown from the car-steps by a thrust from the porter's elbow, as the latter is boarding the car to resume his trip, where there is nothing to show that the porter in getting aboard acted in an improper manner, or that the thrust was due to his careless or willful neglect.[10]

The Supreme Court of the United States holds that passengers are not presumed to know the regulations of railroad companies made for the guidance of conductors of trains in relation to stop over privileges, and unless the passenger has actual knowledge thereof, or the face of his ticket shows the rule requiring a stop-over check, he is entitled to rely upon the representation of the ticket seller as to what is necessary to entitle him to such privilege.[11]

In Indiana the Supreme Court rules that a brakeman, who has no notice of danger, is not bound to use care and watchfulness to discover defects in the road-way and switches which are not so apparent as to be open to the observation of ordinarily prudent men.[12]

In Mississippi the Supreme Court holds that a brakeman on a construction train, who, in spite of the warning of a fellow-servant, attempts to replace on a moving flat-car cross-ties which have become displaced so as to project over the end of the car, and is knocked from the car and killed, is guilty of such negligence as will prevent a recovery from the railroad company for his death.[13]

In Virginia the engineer of an eastbound train approaching several westbound trains, numbered 1st, 2d and 3d, received a telegram from the superintendent, stating that at F. a new westbound train had been interposed, to be called "No. 1," and ordering him to pass said new train, and No. 2, previously No. 1, at an intermediate point. The order stated that said engineer had right of track to F. over No. 3. Having passed 1 and 2, and arrived at F., the engineer received a telegram giving him right of track to a further station over No. 3. Held that, in the light of the rules that westbound trains had right of track over eastbound trains, in the absence of contrary orders, and that when a new train was interposed at any point, the number of each succeeding train was increased by one from, and only from, the time such trains reached that point; the orders were not misleading, or open to a construction that the engineer had the right of track over a train east of F., which was originally No. 2, and was to retain that designation until it reached F.; and where the engineer, acting on such construction, ran into such No. 2, he had no action for an injury caused thereby.[14]

In Pennsylvania the plaintiff was struck by an engine when stepping on the track at a crossing. Her testimony was that, before going on the track, she looked and listened, but that it was dark and foggy and that she was not able to see or hear anything. She testified that she saw a train on the further track, and noticed that it was a coal train and that it carried red lights. Other witnesses testified that it was not foggy and that they were able to see the accident, although they were some distance away. The Supreme Court rules that the plaintiff's negligence was such that the Court ought to have withdrawn the case from the jury.[15]

The Supreme Court of Georgia holds that when a horse takes fright while being driven along the public road running parallel with a railroad, and injury results therefrom, and the cause of the fright is the headlight of the engine, and not the speed of the train, the failure of the engineer to comply with the statute by blowing the whistle and checking the train while approaching a public crossing 125 yards beyond where the injury took place, will not render the railroad company liable for the injury.[16]

In Indiana the Supreme Court holds that it is actionable negligence for a railroad company to so construct a side track that, when cars are standing thereon, freight trains cannot pass on the main line without endangering the lives of brakemen engaged in the discharge of their duties; and the fact that a car causing death, under such circumstances, was left upon the side track by co-servants, is immaterial.[17]

In New York the plaintiff was injured while at work in an ash pit in defendant's railroad yard, and alleged negligence in the construction of the yard. The use of ash-pits like the one in defendant's yard was the usual mode of freeing locomotives of ashes, and the only evidence of its negligent construction was that a water-plug was at the pit, where water was taken while the ashes were being dumped. The Court of Appeals rules that it was error to submit to the jury the question of negligence in the construction of the yard.[18]

In town, while defendant's loaded lumber car was being pushed by hand to a point from which to unload it, plaintiff, who was employed by the consignee, was directed by defendant's agent to set the brake, and, hastily mounting the ladder, was caught between the car and the projecting roof of the freight house platform, and was injured. It appeared from his testimony that he knew that the roof projected, and that the car was higher and wider than ordinary freight cars, and could readily have seen and avoided the danger by a single look. The Supreme Court holds the railroad not liable.[19]

[1] Kansas City, M. & B. R. Co. v. Holland, 8 So. Rep., 516.
[2] Blythe v. D. & R. G. Co., 25 Pac. Rep. 702.
[3] Texas & P. Ry. Co. v. Cuteman, 14 S. W. Rep. 1,069.
[4] C. C., C. & I. Ry. Co. v. Closser, 26 N. E., Rep. 159.
[5] Bohm v. Met. El. R. C., 29 N. E. Rep., 802.
[6] McMinn v. P. M. & R. Co., 23 Atl. Rep. 324.
[7] Hoggatt v. vansville & T. H. R. Co., 29 N. E. Rep. 941.
[8] Costigan v. P. R. Co., 23 Atl Rep., 810.
[9] Bunting v. Hogsett, 21 Atl. Rep. 31.
[10] Lowton v. L. R. & Ft. S. Ry. Co., 18 S. W. 543.
[11] N. Y., L. E. & W. v. Winter's Adm'r, 12 S. C. rep., 356.
[12] Penn. Co. v. McCormack, 30 N. E. Rep., 27.
[13] Ga. Pac. Ry. Co. v. Bradfield, 10 So. Rep., 577.
[14] Harris v. N. & W. R. Co., 14 S. E. Rep. 535.
[15] Hauser v. Central R. Co. of New Jersey, 23 Alt. Ref., 706.
[16] Douglass v. E. T., V. & G. Ry. Co., 14 S. E. Rep., 616.
[17] Penn. Co. v. McCormack, (Ind. Sup.) 30 N. E. 27.
[18] Reichel v. N. Y. C. & H. R. R. Co., 29 N. E. Ref 763.
[19] Platt v. C., St. P., M. & O. R. Co., 51 N. W. Rep., 254.

MEETINGS AND ANNOUNCEMENTS.

Dividends.

Dividends on the capital stocks of railroad companies have been declared as follows:

Atlanta & Charlotte Air Line, semi-annual, 3 per cent., payable Sept. 6.

Chicago & Eastern Illinois, quarterly, 1½ per cent., on the preferred stock, payable Oct. 1.

Chicago & Northwestern, quarterly, 1¾ per cent., on the preferred stock, payable Sept. 22.

Cleveland, Cincinnati, Chicago & St. Louis, quarterly, 1¼ per cent., on the preferred stock, payable Oct. 1.

Connecticut River, quarterly, 2 per cent., payable Oct. 1.

West Jersey, semi-annual, 3½ per cent., payable Sept. 15.

Stockholders' Meetings.

Meetings of the stockholders of railroad companies will be held as follows:

Addison & Pennsylvania, special, New York City, Sept. 26.

Alabama Great Southern, annual, Birmingham, Ala., Oct. 5.

Chicago, Detroit & Canada Grand Trunk Junction, annual, Detroit, Sept. 28.

Chicago, Milwaukee & St. Paul, annual, Milwaukee, Wis., Sept. 21.

Cleveland, Cincinnati, Chicago & St. Louis, annual, Cincinnati, O., Oct. 26.

Connecticut River, annual, Springfield, Mass., Sept. 21.

Florida Central & Peninsular, special, Jacksonville, Fla., Sept. 15.

Illinois Central, annual, Chicago, Ill., Oct. 12, to consider an increase of stock from $45,000,000 to $50,000,000.

Kingston & Pembroke, Kingston, Ont., Sept. 19, to authorize the issue of new 5 per cent. bonds.

Lake Erie & Western, annual, Peoria, Ill., Oct. 5.

Louisville & Nashville, annual, Louisville, Ky., Oct. 5.

Louisville, New Albany & Chicago, annual, Indianapolis, Ind., Sept. 21.

Louisville, New Orleans & Texas, special, New Orleans, La., Sept. 30, and annual, Oct 3, to consider a consolidation with the Yazoo & Mississippi Valley.

Minneapolis & St. Louis, annual, Minneapolis, Minn., Oct. 4.

Ohio & Mississippi, annual, Cincinnati, O., Oct. 13.

New York, Ontario & Western, annual, New York City, Sept. 28.

Northern Pacific, annual, Mills Building, New York City, Oct. 20.

Richmond & West Point Terminal, special, Richmond, Va., Sept. 15, for the election of directors.

Toledo & Ohio Central, special, Toledo, O., Sept. 29, to consider the increase of the stock, the extension of the line and other matters.

Toledo, St. Louis & Kansas City, annual, Toledo, O., Sept. 14.

Wabash, annual, St. Louis, Mo., Sept. 13.

Technical Meetings.

Meetings and conventions of railroad associations and technical societies will be held as follows:

The *Roadmasters' Association of America* will hold its next annual meeting at Lookout Mountain Hotel, Chattanooga, Tenn., Oct. 18.

The *Engineers' and Architects' Club of Louisville* holds regular meetings on the second Thursday of each month, at 8 o'clock p. m., at its rooms in the Norton Building, Louisville, Ky.

The *New England Railroad Club* holds regular meetings, at the United States Hotel, Beach street, Boston, Mass., on the second Monday of each alternate month, commencing January.

The *Western Railway Club* holds regular meetings on the third Tuesday in each month, except June, July and August, at the rooms of the Central Traffic Association in the Rookery Building, Chicago, at 2 p. m.

The *New York Railroad Club* holds regular meetings on the third Thursday in each month, at the rooms of the American Society of Mechanical Engineers, 12 West Thirty-first street, New York City, N. Y. The next meeting will be Sept. 15.

The *Central Railway Club* meets at the Hotel Iroquois, Buffalo, the fourth Wednesday of January, March, May, September and November.

The *Northwest Railroad Club* meets on the first Saturday of each month, except June, July and August, in the St. Paul Union Station, at 7:30 p. m.

The *Northwestern Track and Bridge Association* meets on the Friday following the second Wednesday of March, June, September and December, at 2:30 p. m. in the directors' room of the St. Paul Union Station.

The *American Society of Civil Engineers* holds its regular meetings on the first and third Wednesday in each month, at the House of the Society, 127 East Twenty-third street, New York.

The *Boston Society of Civil Engineers* holds its regular meetings at the American House, Boston, at 7:30 p. m., on the third Wednesday in each month.

The *Western Society of Engineers* holds its regular meetings at 78 La Salle street, Chicago, at 8 p. m., on the first Wednesday in each month.

The *Engineers' Club of St. Louis* holds regular meetings in the club's room, Laclede Building, corner Fourth and Olive streets, St. Louis, on the first and third Wednesday in each month.

The *Engineers' Club of Philadelphia* holds regular meetings at the House of the Club, 1,122 Girard street, Philadelphia, on the first and third Saturday of each month. The annual meeting is held on the third Saturday in January. The club stands adjourned during the months of July, August and September.

The *Engineers' Society of Western Pennsylvania* holds regular meetings on the third Tuesday in each month, at 7:30 p. m., at its rooms in the Thaw Mansion, Fifth street, Pittsburgh, Pa.

The *Engineers' Club of Cincinnati* holds its regular meetings at 8 p. m. on the third Thursday of each month in the rooms of the Literary Club, No. 24 West Fourth street, Cincinnati.

The *Civil Engineers' Club of Cleveland* holds regular meetings on the second Tuesday of each month, at 8 p. m., in the Case Library Building, Cleveland. Semi-monthly meetings are held on the fourth Tuesday of the month.

The *Engineers' Club of Kansas City* meets in Room 200, Baird Building, Kansas City, Mo., on the second Monday in each month.

The *Engineering Association of the South* holds its monthly meetings on the second Thursday at 8 p. m. The Association headquarters are at Nos. 63 and 64 Baxter Court, Nashville, Tenn.

The *Denver Society of Civil Engineers and Architects* holds regular meetings at 36 Jacobson Block, Denver, Col., on the second and fourth Tuesday of each month, at 8 o'clock p. m., except during June, July and August, when they are held on the second Tuesday only.

The *Civil Engineers' Society of St. Paul* meets at St. Paul, Minn., on the first Monday in each month.

The *Montana Society of Civil Engineers* meets at Helena, Mont., at 7:30 p. m., on the third Saturday in each month.

The *Civil Engineers' Association of Kansas* holds regular meetings at Wichita on the second Wednesday of each month at 7:30 p. m.

The *American Society of Swedish Engineers* holds meetings at the club house, 250 Union street, Brooklyn, N. Y., and at 347 North Ninth street, Philadelphia, on the first Saturday of each month.

The *Engineers' Club of Minneapolis* meets the first Thursday of each month in the Public Library Building, Minneapolis, Minn.

The *Canadian Society of Civil Engineers* holds regular meetings at its rooms, 112 Mansfield street, Montreal, P. Que., every alternate Thursday except during the months of June, July, August and September.

The *Association of Civil Engineers of Dallas* meets at 803 Commerce street, Dallas, Tex., on the first Friday of each month at 4 o'clock p. m.

The *Technical Society of the Pacific Coast* holds regular meetings at its rooms in the Academy of Sciences Building, 819 Market street, San Francisco, Cal., at 8 o'clock p. m. on the first Friday of each month.

The *Tacoma Society of Civil Engineers and Architects* holds regular meetings on the third Friday of each month, in its rooms, 201 and 202 Washington Building, Tacoma, Wash.

The *Association of Engineers of Virginia* holds regular meetings at Roanoke, on the second Saturday in each month, at 8 p. m., except the months of July and August.

American Society of Civil Engineers.

The first autumn meeting of the society was held at the society house, New York, Sept. 7 at 8 p. m.

Elections were announced as follows: Ivor Ludwig Sjöstrom, junior. Members: Cary Calvert Barr, George William Catt, James Edgar Denton, Theodore Semenovitch Shmeleff, Walter Eugene Angier, Austin Lord Bowman, Loomis Eaton Chapin, Edward Wilkins Dewey, Frank Lynwood Garrison, Alva Jarvis Grover, Dunkin Wirgman Hemming, Peter Elbert Nostrand, Max Ernst Robert Toltz, Maurice Augustus Viele, George Smedley Webster. Elected by the Board as Honorary Member, William Hassell Wilson.

A paper entitled "The Increasing Cost of Railway Tie Renewals," by Benjamin Reece, M. Am. Soc. C. E., was read by the Secretary. Remarks were made by President Cohen. A paper on "Thin Floors for Bridges," by Albert F. Robinson, M. Am. Soc. C. E., was read by the Secretary. This paper was discussed by Messrs. Clark and Morrison. The Secretary announced the papers for the next meeting: "The Strength and Weathering Qualities of Roofing Slates," by Mansfield Merriman, M. Am. Soc. C. E.; "Motive Power for Street Railways," by Major A. F. Sears, M. Am. Soc. C. E., and "Tests of Power Required to Drive Electric Street Cars, and Total Efficiency of the Motor," by Louis B. Bonnett, Jun. Am. Soc. C. E. It was announced that time for discussion on papers read would be held open for about one month.

New York Railroad Club.

The first regular meeting of the Club for the fall season will be held Thursday evening, Sept. 15, at 7:30, at the rooms of the American Society of Mechanical Engineers, No. 12 West Thirty-first street. Two papers will be presented; one by Mr. Hugh Baines on Rolling Stock in Its Relation to Track, and one by Mr. F. A. Stinard on Boiler Scale and Purification of Feed Water.

PERSONAL.

—Mr. W. V. S. Thorne, Superintendent of the St. Cloud car shops of the Great Northern, has resigned.

—Colonel G. L. Kimball, President of the Dardanelle & Russellville Road, a short line in Arkansas, died at Concord, N. H., last week.

—Mr. J. F. Youse has resigned the agency of the Cincinnati, Hamilton & Dayton at Toledo to become General Freight Agent of the Ohio Southern railroad.

—Mr. Augustus Bradley, who was the first President of the Louisville, St. Louis & Texas Railroad, died in New Albany, Ind., on the night of Sept. 2, at the age of 70.

—Mr. George W. Becker has been appointed Assistant General Freight Agent of the Illinois Central, in charge of the Northwestern lines, vice W. D. Hurlbut, resigned.

—Mr. Henry Johnson, Manager of the works of the Johnson Railroad Signal Co., at Rahway, N. J., sailed for England last week, where he will be absent about a month.

—Mr. William Thaw, eldest son of the late William Thaw, of Pittsburgh, died this week at Cologne, Germany, at the age of 39. Mr. Thaw was prominent in Pittsburgh business circles.

—Mr. J. A. Fairleigh, Assistant Chief Engineer of the East Tennessee Land Co., is also Acting Chief Engineer of the Harriman Coal & Iron Railroad, having been appointed to that position in place of Mr. George F. Simpson.

—Mr. J. G. Butterfield, Master Mechanic of the Sioux City & Northern, at Sioux City, Ia., who has held that position ever since the road was opened, has resigned. No appointment has yet been made to the position, which is being temporarily filled by Mr. Thomas Roope.

—Mr. Edward L. Barcroft committed suicide at San Antonio, Tex., last week. Mr. Barcroft was well known in railroad circles, having been Auditor of the Texas division of the Cotton Belt for several years. At the time of his death he was General Agent for that road at San Antonio.

—Captain John Bagnal, for many years Auditor of the Southern Pacific system, at Houston, Texas, has resigned that position, and will return to his old home in New Orleans, where he will remain in the employ of the company. His place at Houston will be filled by Mr. R. S. Batson, heretofore located at Victoria.

—Mr. George Vernon, who died at Bordentown, N. J., on Sept. 2 at the age of 87, had been in the employ of the Camden & Amboy railroad and its successor, the Pennsylvania, for nearly 60 years, for most of which time he was a locomotive engineer. He first ran a locomotive on the Newcastle (Delaware) road in 1831.

—Mr. George C. Fisk has just completed a term of 40 years' service with the Wason Car Co. Beginning as clerk at $1.00 a day, Sept. 8, 1852, he was admitted to the firm of T. W. Wason & Co. in December, 1854, and was chosen Treasurer of the company organized Feb. 17, 1862, Vice-President April 14, 1869, and President Feb. 6, 1871.

—Mr. Edwin McNeill, who was elected Assistant to the President of the Iowa Central at the recent annual meeting, was formerly General Superintendent of the Pacific Division of the Union Pacific, but resigned that office in July. In his new position he is to give special attention to the development of the coal properties along the Iowa Central.

—Mr. I. W. Fowler, who has been General Superintendent of the Central New England & Western since December, 1890, resigned last week, and has been succeeded by Mr. Montgomery E. Blaine, who has been Trainmaster on the main line and New York division of the Philadelphia & Reading. Mr. Blaine's title is Superintendent of the New England division of the Philadelphia & Reading.

—The resignation of Mr. B. F. Yoakum as Traffic Manager of the San Antonio & Aransas Pass road was announced last week. Mr. Yoakum was one of the receivers of the road before its reorganization, has been with the road since its organization, and was General Manager for some time. He is interested in the firm which has the contract for the rock work at the Galveston jetties.

—Eben Cedron Smeed, Chief Engineer of the Union Pacific system, died at 6:15 a. m., Aug. 24, 1892, at Philadelphia, Pa., whither he had gone a few weeks before for medical treatment of his disease, contraction of the kidneys.

Mr. Smeed was born Dec. 8, 1831, at Windsor, Vt., of old New England stock. His youth and early manhood were spent in Pennsylvania, where his father's business as a heavy lumberman, and later as an engineer and railroad superintendent, afforded excellent opportunities for the development of the active engineering tastes of the son.

Beginning his engineering life in 1851 as a rodman upon a railroad survey, he was soon advanced to the full charge of a division, and rapidly passed through the various grades of engineering service and experience among the mines and railroads of Pennsylvania. He was professionally engaged in the construction of the Panama railroad under Totten and Trautwine, and in 1861 found himself the possessor of an envied reputation. At this early date he numbered among his personal friends Thos. A. Scott, afterwards Assistant Secretary of War, and for so many years connected with the Pennsylvania system. Among the early works in which he took part may be mentioned the old "Portage" bridge on the Erie, which for many years was one of the few really wonderful structures of the early days of railroading. A couple of large stone arches still in use on the D., L. & W., near Scranton, Pa., were built by him, as were many, if not most, of the bridges upon that early line.

At the outbreak of the civil war in 1861 Mr. Smeed entered the service of the nation. His action was no doubt largely due to the fact that Lieutenant-General Scott, then Commander-in-Chief of the army, was a personal friend of Mr. Smeed's father, and a frequent visitor at the Smeed mansion. Mr. Smeed was assigned to duty under Gen. Herman Haupt, then in charge of the Department of Military Transportation for the Army of the Potomac. The provoking slowness with which the West Pointers (by day work only) laid their railroad tracks was beyond endurance, and when, after many anxious solicitations, our "volunteer" engineer was permitted to lay track at night so as not to clash with the West Pointers, he found no difficulty in doing double the work at night that was done during the day by the "regulars," who at that early stage of the war had not yet cut loose from their red tape and text books. At one time, a little later, he had just pitched camp at a burned bridge that he was to rebuild, when a cloaked officer in the dusk asked him when the bridge would be completed. Not knowing the inquirer was General McDowell, he shortly replied "*in two days.*' The next morning Generals McDowell and Haupt were at the bridge site, and McDowell having been formally introduced, stated that if it was possible to rebuild that bridge in two days he proposed to sit on a stump and stay and see it done; and stay he did, making Mr. Smeed's camp his field headquarters. Such rapid work soon made Smeed invaluable, and won him a place on McDowell's staff with the rank of Colonel, where his fertile mind and quick and accurate perceptions were highly appreciated. A pretty illustration of his genius is the following: The General commanding desired to send important messages direct to President Lincoln, but the burning of a bridge and other causes had created a shortage of two thousand feet or more of telegraph wire, which could not be immediately replaced. Colonel Smeed ordered out two regiments of soldiers, who, standing two feet apart, formed a line across the ravine, and with their iron ramrods supported horizontally in the forks of little crotched sticks, furnished a metallic connection through which the telegrams were sent. President Lincoln was a frequent visitor at his camp, claiming that he "liked his cooking better than that of the General." Colonel Smeed, at the head of his men, personally superintended the laying of the first pontoon bridge across the Rappahannock at Fredericksburg during Burnside's ill-fated attack. As the troops passed over the completed bridge, Colonel Smeed exchanged greetings with his own brother, who was among them, but who lost his life in the engagement. Colonel Smeed remained with the Army of the Potomac until after the Gettysburg campaign, when he was transferred to Gen. Thomas' command, and there opened the railroad that took food into beleagured Chattanooga. It was here that he accomplished the remarkable feat of rebuilding in four days, with material from the woods near by, the long and high trestle bridge on the Nashville, Chattanooga & St. Louis, fifteen miles north of Chattanooga. He remained with Thomas and Sherman until the latter began his "march to the sea," when he returned to Nashville and thence to the Atlantic coast, where he was present at the reduction of Fort Fisher, after which he proceeded inland to open railroad communication southward to meet General Sherman.

Colonel Smeed was in active service throughout the war, was wounded several times and passed through many thrilling experiences. At the close of the war he was offered the position of Colonel of Engineers in the regular Army, which honor he declined. He remained for a time at Washington assisting his friend Gen. Haupt in the preparation of his admirable work upon Military Bridges.

Since the war Colonel Smeed has been connected with the engineering departments of the railroad lines comprising the Union Pacific system. Entering the service of the Kansas Pacific in 1866, he was engaged in the construction of a large portion of that company's road and auxiliary lines. As resident or Chief Engineer he remained with the company until it was consolidated with the Union Pacific, at which time he became Assistant Chief Engineer of the newly formed company. He was made Chief Engineer Feb. 1, 1891. Almost all the important bridges and structures on the Kansas division of the company were designed by him. The steel bridge across Snake River near Huntington, Or., and the large steel highway viaduct on Tenth street at Omaha, Neb., are works of his.

Colonel Smeed was widely known, and because of his marked abilities, his skill and his unerring good judgment, he was highly esteemed by such men as Jay Gould and the late Sidney Dillon, and by many other distinguished scientific and railroad men of his acquaintance. He was a great reader and possessed a retentive memory, was a Shaksperean scholar of note, a lover of music, birds and flowers, of little children and youth. His manner was kindly, and to those who knew him his heart was large and tender.

He was married in Pennsylvania before the war to Miss Mary Bates, who died some 20 years ago, and by whom he had one child, a daughter, now Mrs. Charles S. Cross, of Emporia, Kan. His death will be a sad surprise to his many friends. His funeral and burial occurred Aug. 28 at Emporia, Kan.

ELECTIONS AND APPOINTMENTS.

Arkansas Southern.—The first Board of directors of this Arkansas company are: C. C. Henderson, of Arkadelphia, Ark., President; Jesse B. Moore, of Eldorado, Vice-President; Jesse S. Cargile, of Eldorado, Treasurer, and J. W. Armstrong.

Atchison, Topeka & Santa Fe.—Herbert D. Allen has been appointed Auditor of collateral properties of this company, vice H. C. Clemens, resigned.

Buffalo, Rochester & Pittsburgh—W. R. Bergin has been appointed General Ticket Agent with office at Rochester, N. Y.

Chambersburg & Gettysburg.—J. S. Armstrong having resigned the office of Superintendent the duties of the position have been assumed by the General Manager, J. J. Moorehouse, 93 Nassau street, New York.

Chicago, Burlington & Northern.—George B. Harris, formerly Vice-President, has been elected President of this company, with office at Chicago.

Coal River.—At a meeting of the incorporators in Charleston, W. Va., recently, the following persons were elected directors: John Byrne, R. P. Chew, John L. Cochran, Thomas L. Broun, D. B. Lucas, R. T. Oney, Roman Pickens, William M. Peyton and Fontaine Broun. The directors elected Thomas L. Broun, President; R. T. Oney, Treasurer, and W. Peyton, Secretary; all of Charleston, W. Va.

Duluth & Winnipeg.—H. J. Boardman has been elected President of this company.

Florida Midland.—George E. Simpson has been appointed General Freight and Passenger Agent, vice J. E. Barnes, and J. M. Booth, Auditor, vice C. W. Barnes.

Fort Worth & Rio Grande.—Oscar White has been appointed General Passenger and Freight Agent, with office at Fort Worth, Tex., in place of Richard Lord, resigned.

Galveston, Harrisburg & San Antonio.—R. S. Batson, Auditor of the New York, Texas & Mexican and Gulf, Western Texas & Pacific, has been appointed Auditor of this company in place of John Bagnall, resigned.

Hutchinson & Southern.—F. E Wise has been elected Secretary and General Manager of this company with office at Chicago. He also continues to act as Treasurer. Charles R. Davis, heretofore Secretary, has been appointed Assistant Secretary. O. P. Byers, formerly Assistant Secretary and Superintendent, is now Superintendent.

Illinois Central.—E. G. Russell has been appointed Superintendent of Western Lines, with office at Dubuque, Ia., taking effect Sept 1. J. M. Daly has been appointed Superintendent of Transportation with office at Chicago, in place of E. G. Russell, taking effect Sept. 1. The office of car accountant has been abolished, and the Superintendent of Transportation will attend to that department.

Iowa Central.—At the annual meeting of stockholders in Chicago, Sept. 2, these directors were elected for the ensuing year: Russell Sage, Edward E. Chase, H. J. Morse, Giles E. Taintor, William E. Strong, E. McNeill, C. H. Ackert, Rufus A. Sage and E. H. Perkins. E. McNeill was elected Assistant to the President, a newly created office.

E. S. Benson, previously Auditor, has been appointed General Auditor of this company. H. A. Loudon has been appointed General Eastern Agent with headquarters at Pittsburgh, vice P. A. Lynn, resigned.

Kansas City Suburban Belt.—A. A. Mosher, President of the Kansas City & Independence Air Line, has also been elected Second Vice-President of the company. W. S. Taylor, previously Assistant Secretary, has been elected Secretary, vice Chas. A. Dean. Mr. Taylor continues as Treasurer. J. H. Pickering, previously Superintendent, has been appointed General Superintendent.

Los Angeles Terminal.—Wm. Wincup has been appointed Superintendent, in addition to his office as General Passenger and Freight Agent. F. K. Rule has been appointed Auditor, vice G. E. Wright; both with headquarters at Los Angeles, Cal.

Louisville, New Orleans & Texas.—D. B. Morey has been appointed General Freight Agent, with headquarters at New Orleans; A. H. Hanson, General Passenger Agent, with headquarters at Chicago; and J. W. Coleman, Assistant General Passenger Agent, with headquarters at New Orleans. These men all held similar positions on the Illinois Central.

M. Gilleas has been appointed General Superintendent with headquarters at Memphis, in place of M. B. Cutter.

A. A. Sharp has been appointed Superintendent of the Memphis division in place of W. J. McKee, resigned. These changes are due to the separation of this road from the Newport News & Mississippi Valley.

Madison, Alton & Chicago.—F. B. King having resigned to accept other service George T. Anderson has been appointed Superintendent with office at Commercial Building, St. Louis, Mo.

Newport News & Mississippi Valley.—The traffic agreement between this company and the Louisville, New Orleans & Texas was abrogated on Sept. 1, and separate traffic officers were appointed by the two roads. L. F. Day, whose jurisdiction as Traffic Manager has extended over the two lines, has been appointed Traffic Manager of this company. F. C. Dumbeck, Assistant General Freight Agent, with headquarters at Memphis, will, on Oct. 1, succeed B. F. Mitchell, whose title was General Freight Agent. W. H. Prouty, General Passenger Agent of the company, has resigned, and the office will be abolished on Oct. 1. Thomas B. Lynch will be his successor, with the title of Assistant General Passenger Agent.

Philadelphia, Reading & New England.—Montgomery E. Blaine, formerly Trainmaster on the Philadelphia & Reading, has been appointed Superintendent of this road with headquarters at Hartford, Conn.

Port Arthur, Duluth & Western.—The annual meeting of the company was held at Port Arthur, Ont., Aug. 29. The following directors were elected; W. R. Brock, Toronto, President; D. F. Burk, Port Arthur, Vice-President; G. O. P. Clave, M. Dwyer, Ross Thompson, Port Arthur; W. C. C. Abbott and Peter McKeller, Fort William; A. B. Lee and David Blain, Toronto.

Portsmouth Park Railway & Development Co.—The directors of this company are the following: Wm. H. Stewart, President, Portsmouth, Va.; Fergus Reid, Vice-President, Norfolk, Va.; R. M. Stuart Wortley, Secretary, New York, N. Y.; C. S. Sherwood, Treasurer, Portsmouth, Va.; L. R. Watts, Wm. Schmoele, H. E. Magruder, and E. C. Brooks.

Sioux Falls Western.—The officers of this road are as follows: Melvin Grigsby, President; E. B. Meredith, Vice-President; C. E. Baker, Secretary: C. E. Johnson, Treasurer; D. C. Rice, Chief Engineer; all of Sioux Falls, S. D.

White & Black River Valley.—W. J. Thompson has been elected President, to succeed R. W. Martin, deceased. Mr. Thompson continues to act as General Manager and Treasurer. E. G. Thompson has been elected Secretary, and will continue to perform the duties of General Passenger Agent.

RAILROAD CONSTRUCTION.

Incorporations, Surveys, Etc.

Alexandria & St. Louis.—This is the name of a company, with a capital stock of $3,300,000, which has just filed its charter at Monroe, La. The incorporators are F. G. Hudson, John P. Parker, L. D. McLain, A. C. Hough, W. A. Bright, R. B. Blanks and I. J. Newton, all prominent business men of Monroe. The road is designed to commence at a point on the line of Louisiana and Arkansas and will extend in a southwesterly direction through the parishes of Morehouse, Ouachita, Caldwell, Catahoula, Grant and Rapides to Alexandria, La.

Arkansas Southern.—This company filed articles of incorporation last week in Arkansas with a capital of $130,000. The road will extend in a southeasterly direction, 13 miles from Eldorado, in Union County, Ark., to the Louisiana line. C. C. Henderson, Arkadelphia, is President.

Bloomfield Junction.—This company has surveyed a road from the junction of the Perry County and Newport & Sherman's Valley roads, about 2½ miles west of Bloomfield, Pa.

Burlington & Missouri River.—The completion of the Culbertson line to Imperial, Chase County, Neb., about 50 miles from Culbertson, Neb., was celebrated at the former town last week, and it was estimated that 3,000 people were present. The present terminus of this line is about 32 miles northwest of Wauneta, Neb., to which place trains began running in January. The company has still about 30 miles to build to complete the new road to the proposed connection with the Cheyenne line at Holyoke, Col.

Canadian Pacific.—Contractors Ross, Mann & Holt are pushing the grading in Crow's Nest Pass, and 300 men are at work, and about 20 miles has been graded. It is believed that the company has been quietly pushing the work with the view of pre-empting the entire pass, which at many points is too narrow for more than one road. The line is laid out to MacLeod, Alberta, where it connects with Calgary & Edmonton; and it is said that the intention of the company is to extend lines due east to connect at Estevain, Man., with the new Sault cut off now being built to the national boundary.

Cherry Run & Potomac Valley.—This company, which was chartered a few months ago, is a part of the Baltimore & Ohio and is to be built for the purpose of giving that road an easy grade for freight trains from Cherry Run, W. Va., eastward to Harper's Ferry. At several points on the present line the grade is 80 ft. to the mile. The surveys for the new line are completed, and it is stated that work will be commenced at once and the road made ready for use by next June. The line of the road follows the Potomac river at about the high water line and the heaviest grade is only 6 ft. to the mile. The distance is about the same as on the old line, 32 miles.

Chicago & Eastern Illinois.—The grading for the second track between Momence and Danville, Ill., has been completed for about 25 miles and five miles of track has been laid since June 1. The contracts were let some months ago to W. P. Chapman, of Elgin, Ill., for the grading and masonry for the second track on about 40 miles of the main line to Danville, between Momence and Danville, at those points at which a second track has not been already completed.

Coal River.—An organization of this company was recently effected at Charleston, W. Va., T. L. Brown being elected President. The route of the road is to be from St. Albans, W. Va., southwest up Coal River to Peytona in Boone County, about 40 miles, and thence to the Guyandotte River, and to connect with the Norfolk & Western in Mercer County. The organization of this company is only temporary, the subscriptions thus far being in land only. About 13,000 acres of land is now secured, and the projectors confidently expect to secure enough pledges within a month to let contracts for the construction of the 40 miles of road above mentioned.

Colorado Midland.—The construction of the Cripple Creek branch is to be begun at once, a contract for grading the first eight miles having been let last week to Price & McGavock, of Hutchinson, Kan. The line extends from Hayden Divide, on the Colorado Midland, to the town of Cripple Creek, 21 miles, and the survey has been completed for the whole distance. The work on this eight mile contract, which extends to a place called Midland, near the junction of the north and east forks of Oil Creek, is not difficult. There are no important bridges on this section. The maximum grade will be 158 ft. per mile and the maximum curve 12 deg.

Concord & Montreal.—The contract for the construction of the New Boston branch of this road has been let to Ward Brothers, of Kennebunk, Me. This branch begins at Parker's Station on the Manchester & North Weare division and extends southward, 4½ miles, to New Boston, N. H.

Cumberland Valley.—A corps of engineers in charge of Alexander Murdock has begun a preliminary survey from the town of State Line, on the line between Maryland and Pennsylvania, to Hancock, Md., in order to test the advisability of building a line of railroad between the two points for the purpose of connecting the West Virginia Central & Pittsburgh at Hancock, with the Cumberland Valley road, at State Line. The West Virginia Central has been making great efforts in the past few years to secure an outlet to tide water, but in each instance it has been unsuccessful, the last rebuff being the effort to purchase the Western Maryland. The West Virginia Central Co. already has engineers working from Cumberland east to Hancock, where they expect to meet the Cumberland Valley's men.

Duluth, Mesaba & Northern.—Track has been laid to the last crossing of the St. Louis River, and the work is now delayed while the bridge is being erected. The bridge will be completed and the track will be laid to the Mountain Iron mine by Sept. 10. Grading on the branch to the Biwabik mine is finished and tracklaying is being pushed. On this branch there are three large trestle bridges which delay the progress of the track. It is estimated that the road will be completed to the Biwabik between the 20th and 25th of this month.

Fair Hill.—An ordinance to authorize this road to build through the Thirty-third Ward, Philadelphia, has been reported upon favorably by the railroad committee to the City Council. This is the fourth time the matter has come before the council, the ordinance having been defeated three times this year on account of the objection to the proposed grade crossings. The line is to be a freight branch of the Pennsylvania, about one mile long, extending from North Penn Junction to Somerset street, crossing seven streets at grade.

Fairmont, Morgantown & Pittsburgh.—Work on the extension of this line from Morgantown, W. Va., toward Point Marion, Pa., is now progressing rapidly. The work which was commenced last spring by the Baltimore & Ohio company was delayed by bad weather and slow delivery of supplies until about July 1, since when a large force has been at work. At this time the grading and bridge work is in progress all along the line, and prospects are fair for the completion of the line this winter, though the date will be later than was at the outset contemplated.

Galveston & Beaumont.—G. W. Cooley, of Minneapolis, represented to be the agent of a syndicate which proposes to build a road from Galveston northeast to Beaumont on the Neches River, about 50 miles, has made an inspection of the route and says that it is through a level country with only small bayous to cross. There is timber along the entire line. He details at some length plans for a bridge from North Galveston to Smith Point, which are 7¼ miles apart. One-fifth of this distance could be filled in and the work could be done for $1,250,000, etc.

Georges Valley.—The grading has been already begun on this road at West Warren station, where connection is made with the Knox & Lincoln branch of the Maine Central. The road is to be about eight miles long and will extend north to South Union, Me. It has been decided to build a standard gauge road. James Mitchell, of West Warren, has the contract for building the road. No sub-contracts will be let. The location of the line is being rapidly completed. William Lee, of Bucksport, Me., is Chief Engineer.

Great Northern.—The work of rebuilding the Casselton branch is progressing satisfactorily, and track is being laid at the rate of a mile a day. There is only one bridge of any size on this branch. It is a single span 44 ft. truss across the Goose River.

Hot Springs & Mountain Valley.—This is the name of a company organized in Arkansas last week. The line will extend from Hot Springs in a northwesterly direction through Garland County to Mountain Valley, a distance of 13 miles. The officers are the same as those of the Little Rock & Hot Springs, mentioned below.

Irondale, Bancroft & Ottawa.—The grading has been completed for eight miles east of Irondale, Ont., this summer, and it is expected to lay the track on 10 miles to near Bancroft, Ont., during the fall.

Kansas City, Arkansas & New Orleans.—The company expects to complete its road from Hazen to Stuttgart, Ark., in a month. G. H. Beebe, of Beebe, Ark., is Vice-President.

Lake Street Elevated.—Chicago papers report that the syndicate of New York and Chicago capitalists who have been looking at this partly built Chicago elevated road with a view to buying it, have practically completed the bargain, and that a new company will soon be formed. Among the men interested are: Edson Keith, Andrew McNally and Harley Bradley. The projectors of the new company have already done a good deal of work toward securing a right of way along the north side of the alley between Van Buren and Congress streets.

Little Kanawha Valley.—The local incorporators of this company, which proposes to build a railroad from Parkersburg, W. Va., to Ritchie Court House, up the valley of the Little Kanawha River, are making strenuous efforts to secure sufficient capital to begin work on the line this winter, or early next spring. At the invitation of the Parkersburg Board of Trade a party of gentlemen, including H. A. Blood, A. C. Barton, Jr., G. N. Smalley and W. S. Chapman, of Boston, and H. C. Jackson and V. B. Archer, of Parkersburg, and Engineer Thomas Pettigrew, of the company, made a trip over the proposed line a few days ago, with a view of ascertaining the advisability of backing the road financially.

Little Rock & Hot Springs.—Articles of incorporation were filed in Little Rock, Ark., Sept. 3. The line will be 60 miles long and will run in a southwesterly direction from Little Rock through Pulaski, Saline and Garland counties. The officers and directors are Col. Zeb Ward, of Little Rock, President; S. H. Still, of Hot Springs, Secretary; Col. E. Rector, of Hot Springs, Treasurer, and Judge Ebin W. Kimball, of Little Rock. The capital stock is $750,000, $60,000 of which is already subscribed. The projectors say that four miles of the road will be built at once.

Louisville, New Orleans & Texas.—Several of the officers went over the route for the proposed line to Minter City, Miss., last week. The new road will be a connecting line between the Yazoo branch and the Louisville, New Orleans & Texas, and two routes are proposed, one from Greenwood north to Minter City, 15 miles, and the second from Parsons west to the same town, about the same distance.

Macon, Dublin & Savannah.—The grave announcements that the construction of the Savannah extension of this road had been commenced last week seem to be based on the fact that about 25 men are at work near Savannah on the land granted to the company by the city of Savannah last year, on the condition that it begin work on the extension of its road to Savannah, 110 miles east of Dublin, within a stipulated period.

Manitoba & Northwestern.—A petition has been largely signed all along the line of this road asking the Dominion government to grant to the company the same subsidy as the Calgary & Edmonton, $80,000 a year for 20 years for carrying the mail, etc. This would enable the company to complete the road through to Prince Albert in Alberta.

Montgomery, Hayneville & Camden.—Adams & Pruitt, of Montgomery, have the contract for grading the first 10 miles from Camden, Ala., but only a small amount of the stock has been subscribed, and the work is not likely to be commenced for a month. S. D. Bloch, of Camden, is President.

Muncie Belt.—This is the name of a company formed to build a belt line around the city of Muncie, Ind. It is controlled by the Cleveland, Cincinnati, Chicago & St. Louis. The total length of the line surveyed is about nine miles, some of it lying outside the city limits, but it is intended to build at present only about two miles. The work is all easy and will be done by the forces of the "Big Four" road.

Natchez, Alexandria & Texas.—Articles of incorporation of this Company were filed at Alexandria, La., Sept. 6. The officers and incorporators are Charles E. Roberts, President; J. G. White, Vice-President; R. W. Brighurst, Secretary; George A. Roberts, Treasurer; A. Strous and E. D. Rand, all of Alexandria, except Rand, who is from Atlantic, Texas. The road will run in a southwesterly direction from Natchez to a point in Jasper County, Texas. The capital stock is $4,000,000.

New Roads.—Bids have been received for grading a road fom Crested Butte, Col., northwest to Yule Creek, and it is proposed to begin the grading this week with about 500 men. The road will reach large marble quarries and a number of low grade ore mines, which will probably be started up as soon as the road is completed. The rails will not be laid until next spring.

Pensacola & Northwestern.—It is again reported that the work is to be commenced very soon on this new road northwest of Pensacola, Fla. The local papers state that the company is running trains to Millview, which would seem to indicate that the company has purchased the Pensacola & Perdido Railroad, 10 miles long. Henry McLaughlin, of Pensacola, is President of the road and C. H. Dishman, of Nashville, Tenn., is Secretary.

Philadelphia & New England.—A charter was granted in Philadelphia, Sept. 7, to the Philadelphia & New England Railroad Company, of Pennsylvania, with a capital of $2,000,000. The proposed line is from Stroudsburg, Monroe County, to a point on the Delaware River near Port Jervis, also from a point on this river to Bushkill, Pike County, and from the Stroudsburg terminus to the village of Saylersburg, in Monroe County. The total length is 57 miles. The president is Stephen Holmes, of Stroudsburg. A protest against this charter was entered by the Pennsylvania, Lehigh Valley & Northeastern Railway Company, which desired to secure right of way over substantially the same route, but it appears that the Secretary of State set it aside.

Philadelphia & Reading.—The Buffalo & Geneva, which constitutes the Buffalo division of the Reading system, was opened for passenger traffic on Sept. 1. The new line has two through trains each way daily, and in addition to this there are two express trains each way daily between Rochester and Buffalo. This road gains an entrance to Rochester by the aid of the Buffalo, Rochester & Pittsburgh, and that company furnishes one of the two trains which run between Rochester and Buffalo. Through cars are run from Philadelphia and from Jersey City to Buffalo, the through service being practically the same as that which has heretofore been run over the New York, Lake Erie & Western track between Waverly and Buffalo. The Reading terminus at Buffalo is at Scott and Washington streets, and the station in Rochester is at South Saint Paul street. The Erie has put on a train to take the place of one of the Lehigh Valley (Reading) trains taken off from its line.

Portsmouth Park Railway & Development Co.—This is the name of a company which proposes to build a railroad from Portsmouth, Va., southward, about four miles, to the Norfolk & Western road. The line is now being surveyed by Chief Engineer Furber, and it is expected that contracts will be let in about a month The names of the officers of the road are given in another column.

Quebec, Montgomery & Charlevoix.—H. J. Beemer, of Ottawa, expects to complete that line to St. Joachim, Que., about 10 miles east of Ste. Anne, this autumn, and to Les Eboulements, 30 miles, next year.

Shullsburg & Western.—The surveys have just begun for this road which is to be built from Shullsburg, Lafayette County, Wis., near the southern state line in a westerly direction for about eight miles to zinc mines, which will thus secure a railroad outlet for their product. The officers are: President, H. H. Blood, Boston; Treasurer, Frederick Swift, New York City; Secretary, Charles H. Blood, Boston.

Sioux City, Washington & Baltimore.—At the town election at Sioux City, Ia., Aug. 24, a two per cent. tax, estimated to be equivalent to $400,000, was voted this company, to be payable when the road has been built to the Little Sioux River. The company was organized this year and has had some surveys made through Woodbury County, east of Sioux City. N. Desparios is President and T. P. Gere, Vice-President, both of Sioux City.

Sioux Falls Western.—The surveys were begun last week west of Sioux Falls, S. D., and it is proposed to award the contracts for building the road this month, and complete 15 miles in October. The road is to extend to Parker and southwest to Yankton, S. D. The grading will average from 16,000 to 20,000 yds. to the mile, and the maximum grade will be 30 ft. to the mile. The Sioux and James Rivers are the only streams of consequence to bridge. Melvin Grigsby, of Sioux Falls, is President.

Snowfork & Hocking.—The construction work on this line to Athens, O., is progressing rapidly; the grading has been nearly completed and some track has been laid. The road is a branch of the Newark, Straitsville & Somerset road, operated by the Baltimore & Ohio, and is to extend south from near Buchtel through the Hocking Valley to reach coal lands owned by the Columbus & Hocking Coal & Iron Company.

St. Paul & White Bear.—The engineers of this company are now surveying for an extension from Four Lakes to Stillwater, Minn. This road is an electric line which is an extension of the former North St. Paul street railroad, and is about 11 miles long. The proposed extension will make it 20 miles long.

Superior Belt Line and Terminal.—Grading has been finished and the track will be completed, making the connections with the Duluth & Winnipeg, as soon as the bridge across the St. Louis River at New Duluth is completed. It will require about ten days' work before the tracks can be connected.

Tavares, Atlantic & Tampa Bay.—A survey is being made by Mr. Butler, County Surveyor, from Tavares easterly through Paisley and De Land to Lake Helen, Fla., on the Atlantic & Western, a distance of 30 miles. The survey has been completed to the crossing of the St. John's River.

Tennessee & Coosa.—The grading of the 14-mile extension of the Nashville, Chattanooga & St. Louis from Huntsville, Ala., south to the Tennessee River, is nearly finished, and tracklaying was commenced last week.

Toronto, Hamilton & Buffalo.—The by-law to grant $275,000 to this company for the purchase of right of way for its road through the city of Hamilton, Ont., has been passed by that city. The by-law requires that the bonus be paid to the company only after the road is built and in operation.

Unaka & Nola Chucky.—J. L. Cain, of Morristown, Tenn., Vice-President, states that negotiations are in progress for building his road by the Nashville, Morristown & Atlantic Railroad. The road is to extend from Erwin to Morristown, a distance of about 75 miles.

Weiser & Northern.—This company has been chartered in Idaho to build a railroad from Weiser north to Seven Devels, 100 miles. The capital stock is $100,000. The incorporators are: W. F. Sommercomp, P. A. Devers, J. B. Cookley, G. M. Waterhouse and T. C. Galloway, of Weiser, Idaho.

Winston & Bone Valley.—The company is now carrying the products of the phosphate mines located in the valley south of Winston, Fla., the road having been completed for 25 miles south of that town, which is located on the South Florida road between Lakeland and Plant City. J. E. Griffen, of the Winston Lumber Co., is President and General Manager of the road.

GENERAL RAILROAD NEWS.

Canadian Pacific.—The company took formal possession on Sept. 1 of the Montreal & Western now completed from St. Jerome north to Ste. Agathe; increase 30 miles. This road is leased for five years to the Canadian Pacific with the option of purchasing it at the end of that time. One condition of the lease is that the original owners of the line shall build the road to St. Jovite. This extension will be begun at once.

Chicago, Rock Island & Pacific.—The estimated gross earnings of the system, including the lines both east and west of the Missouri River, for the month of August were $1,935,831, an increase as compared with those of the corresponding month last year of $277,388.

Cincinnati, Hamilton & Dayton.—The proposition to authorize the execution of a mortgage supplemental to the general mortgage, dated June 1, 1892, securing the issue of $3,000,000 general mortgage bonds, and providing for the issue of $4,800,000 additional bonds to be issued at the discretion of the directors in refunding operations, was voted by the stockholders at last week's meeting, 32,422 shares being voted in its favor.

London & Port Stanley.—The Grand Trunk has offered to continue to operate the road for six months, dating from Sept. 1, at the same rate it is now paying, $20,000 a year. The City Council, of London, Ont., has accepted this offer.

Louisville & Nashville.—The earnings and expenses for July were as follows:

	1892.	1891.	Inc. or dec.
Miles operated	2,933	2,809	I. 73
Gross earnings	$1,834,271	$1,866,791	D. $32,520
Operating expenses	1,197,369	1,175,590	I. 21,779
Net earnings	$636,902	$691,201	D. $54,299

Minneapolis & St. Louis.—The hearing in the foreclosure proceedings which was to have been held Aug. 22 last will take place Oct 10. It only became generally known last week, through the stockholders' committee, that the hearing had been postponed. The committee published a statement in the daily newspapers asserting that the reorganization is being obstructed by the Chicago, Rock Island & Pacific. They state that in August H. H. Porter began suit as owner of $2,000,000 improvement and equipment bonds supposed to be in the treasury of the Rock Island, and asked for a judgment on these bonds. On hearing of this suit, the stockholders' committee addressed a note to the receiver of the company, insisting that a proper defense be put in to the suit and that judgment should not be allowed to go by default. It is now announced that this suit has been discontinued.

Montreal & Sorel.—The sequestrator of the road, Mr. A. A. Taillon, of Sorel, Que, has informed the provincial government that arrangements have been concluded with the Grand Trunk whereby that part of the line between St. Lambert and Longenil, Que., will be open for traffic on Sept. 10.

Pennsylvania.—W. H. Brown, Chief Engineer, denied last week the rumor that all construction work on the main line had been suspended. Mr. Brown said: "We have so much to do with the work already begun that it was deemed advisable not to enter upon any further new operations this summer. In consequence of this, orders were sent to Pittsburgh not to give out contracts for two points on the Pittsburgh Division, at Nineveh and at Cresson, at which we had contemplated doing work."

Richmond & West Point Terminal.—Receiver Walter G. Oakman has been granted permission to enter a suit to cancel the agreement by which this company acquired the Central of Georgia, a number of stockholders having requested him to do this. The petition on which the order was granted says that among the securities appearing to be owned by the Terminal Company, the Receiver found scheduled $12,000,000 capital stock of the Georgia company, and also $3,553,000 collateral trust bonds issued by the Georgia company. These bonds are in the possession of the Central Trust Company as part security for the Richmond Terminal collateral trust 5 per cent. bonds. It will be remembered that the Terminal company acquired control of the Central of Georgia by purchasing 40,000 shares of its stock owned by the Georgia company. This purchase cost the Terminal company over $7,000,000, which, it is alleged, was a very exorbitant price. The petition then recites the fact of the recent decisions in the United States District Court in Georgia, declaring the Georgia company to be disqualified from holding the Central Railroad of Georgia, and the disfranchisement of the stock held by the Richmond Terminal. The petitioner also quotes the Receiver of the Central of Georgia as informing him that that corporation, in the last three years, has not realized in net earnings enough to cover the present fixed charges. The papers then say: "Your petitioner has carefully examined the records of the minutes of the stockholders of the Terminal company, and is advised and believes that there has been no ratification sufficient in law or equity to conclude and bar the stockholders of the company or your petitioner from asserting their rights to cancel these transactions."

West Virginia Central & Pittsburgh.—This company is making general improvements along its line in West Virginia. Nearly five miles of new sidings have been put in at various points, so that the road is practically double track all the way from Copeland to Fairfax. New ballast has been put in this summer along a good part of the line and the roadbed has been generally improved and bridges strengthened. The company is now running through trains from Cumberland, Md., to Bellington, W. Va., and thence to Grafton on the Baltimore & Ohio, a distance of 172 miles.

TRAFFIC.

Traffic Notes.

The Pike's Peak Railroad has carried nearly 20,000 passengers this season.

The receipts of grain by lake from the opening of lake navigation up to Aug. 30, at Buffalo and Erie, were about 68,000,000 bushels, of which Erie received 14 per cent.

For the year ending Sept. 1, the amount of grain exported from New Orleans was 15,261,864 bushels, which is nearly 10 times the quantity exported from that port in the previous year.

The New York *Herald* claims that the Interstate Commerce Commission has secured important documentary evidence which will convict some of the weaker trunk lines of rate-cutting on west bound freight.

The rush of passengers home from the summer resorts about Sept. 1 seems this year to have been greater than ever. At the Desbrosses street station of the Pennsylvania Railroad in New York City on Aug. 30, the number of pieces of baggage handled was about 9,000, four and a half times greater than the average movement.

The boastings of the Philadelphia merchants over their good fortune in getting the railroads to allow passengers for New York to stop over at that city, have stirred up the Merchants' & Manufacturers' Association of Baltimore, which now asks the Baltimore & Ohio to grant the stop-over privilege there

The Northern Pacific has issued a circular, based on the recent decision of the United States Court, announcing that freight coming from the east by the Union Pacific will not be accepted at Portland for transportation over the Northern Pacific lines, unless loaded in Northern Pacific cars and prepaid through. If the circular is correctly reported the action of the company would seem to be a practical discrimination in favor of other shippers from whom pre payment is not demanded.

A number of Texas railroads have raised their rates since the decision of the United States Court weakening the power of the State Railroad Commission, and it seems likely that every other road affected will now make such rates as its pleases. The Fort Worth & Denver City, however, has decided not to raise its cotton tariff, the cotton traffic on this road being light. The freight agents of the Texas roads met in St. Louis this week to consider the revision of interstate rates made necessary by the change in intrastate rates.

The Philadelphia & Reading on Sept. 2 notified the Pennsylvania that it would no longer make through rates over the lines of the two companies on anthracite coal, the reason being that the Pennsylvania refuses to advance the joint rates as desired by the Reading. The traffic affected by this decision goes mostly to Philadelphia and points south of there, much of it being delivered to the Pennsylvania at Phillipsburg, N. J. The Pennsylvania officers have little to say about the matter, but the Reading people state to the reporters that the Pennsylvania will now have to see that the consumers along its lines are furnished with anthracite from mines on the Pennsylvania lines, and that that road will thus have a less quantity of coal to ship to the large competitive markets.

Chicago Traffic Matters.

CHICAGO, Sept. 7, 1892.

The Illinois Central and Baltimore & Ohio have agreed to charge other lines desiring trackage facilities over their tracks to the World's Fair grounds pro rata per mile on the current rates in effect at the time, with a minimum charge of one cent a mile.

Since the Burlington adopted the continuous passage rule on local tickets and agreed to redeem unused tickets, it has had such a large number of requests for redemption of tickets that the officers are beginning to become suspicious that in many instances the tickets presented have been ridden upon but have been overlooked by the conductors. This has led to the issuing of a circular calling attention to the matter and advising extra vigilance on the part of conductors in collecting tickets.

Chairman Caldwell has authorized interested lines to meet the rates made by the Chicago Great Western in connection with the Canadian Pacific $55 first class and $35 second class from Chicago to Portland, Tacoma, Seattle and Puget Sound points, Aug. 26 to Sept. 15; also $57.90 and $37.90 to San Francisco via St. Paul and the Canadian Pacific.

The Passenger Rate Committee of the Trans-Continental Association has its regular meeting this week. It has under consideration the question of commissions on trans-continental passage traffic westbound. This is the matter that the Atchison has been urging consideration of for some time, alleging that excessive commissions are being paid by some of its competitors so that it is in effect shut out of the business and threatening to make an open rate that will take the business unless it is remedied.

The Commissioners of the Western Traffic Association have declined to authorize the rate of 50 cents per 100 lbs. on canned goods, wine, borax and beans, eastbound from San Francisco, asked for by the Southern Pacific to enable it to meet the clipper competition. The decision is on the ground that the facts and arguments did not warrant the reduction. The impression is that the matter will rest with the decision of the Commissioners.

In regard to the application by the same company to put into effect westbound rates to meet the competition of the Canadian Pacific proposed by its notice of reduction for Sept. 10, the Commissioners rule that inasmuch as the matter was considered at the last meeting of the Trans-Continental Association in New York and the relief granted, there is now no disagreement before them demanding action.

Owing to the practice of the Keokuk & Western in furnishing return transportation for an attendant in charge of every car of live stock, instead of for only one man with each shipment, the Western Freight Association has granted relief to such of the members as are affected by this action. It is announced, however, that the relief is only temporary.

The Freight Committee of the Central Traffic Association and the Joint Committee of the Central Traffic and Trunk Line associations have agreed that the weight of boxed meats packed in salt—not canned meats—shall be estimated at 18 per cent. over the net weight of the meat; when packed in borax or cotton, at 13 per cent. over net weight.

Eastbound Shipments.

The shipments of eastbound freight, not including live stock, from Chicago by all the lines for the week ending Sept. 3 amounted to 59,018 tons, against 54,948 tons during the preceding week, an increase of 4,060 tons, and against 50,794 tons during the corresponding week of 1891, an increase of 8,224 tons. The proportions carried by each road were:

Roads.	W'k to Sept. 3.		W'k to Aug. 27	
	Tons.	P. c.	Tons.	P. c.
Michigan Central	8,649	14.7	7,947	13.4
Wabash	3,575	6.1	3,462	6.2
Lake Shore & Michigan South.	6,334	10.7	5,682	10.3
Pitts., Ft. Wayne & Chicago	7,183	12.2	8,884	16.1
Pitts., Cin., Chicago & St. Louis	7,612	12.9	9,697	17.6
Baltimore & Ohio	3,781	6.4	2,831	5.2
Chicago & Grand Trunk	4,098	6.9	5,837	10.6
New York, Chic. & St. Louis	7,873	13.3	4,646	8.5
Chicago & Erie	9,256	15.7	5,799	10.6
C., C., C. & St. Louis	657	1.1	733	1.4
Total	59,018	100.0	54,948	100.0

Of the above shipments, 3,413 tons were flour, 22,510 tons grain and millstuff, 9,974 tons cured meats, 12,277 tons dressed beef, 1,589 tons butter, 1,747 tons hides, and 4,967 tons lumber. The three Vanderbilt lines carried 38.7 per cent., the two Pennsylvania lines 25.1 per cent. The lake lines carried 117,630 tons, against 87,863 tons during the preceding week, an increase of 29,767 tons.

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PITTSBURGH, PA., U. S. A.,

MANUFACTURERS OF THE

WESTINGHOUSE AUTOMATIC BRAKE

The WESTINGHOUSE AUTOMATIC BRAKE is now in use on 24,000 engines and 325,000 cars. This includes (with plain brakes) 232,000 freight cars, which is about 23 PER CENT. of the Entire Freight Car Equipment of this country, and about 80 per cent. of these are engaged in interstate traffic, affording the opportunity of controlling the speed of trains by their use on railways over which they may pass. Orders have been received for 173,000 of the Improved Quick-Action Brakes since December, 1887.

The best results are obtained in freight train braking from having all the cars in a train fitted with power brakes, but several years' experience has proven conclusively that brakes can be successfully and profitably used on freight trains where but a portion of the cars are so equipped. Below is a graphical illustration of the progress made in the application of the Automatic Brake to freight cars since its inception

Year.	No. per year.	Grand total.
1881	105	105
1882	1,085	1,190
1883	4,966	6,156
1884	15,051	21,207
1885	10,410	31,617
1886	8,946	40,563
1887	9,281	49,844
1888	27,696	77,540
1889	26,065	103,605
1890	50,502	154,107
1891	39,061	193,168

193,168 freight cars fitted with the Westinghouse Automatic Brake, which is nearly 20 per cent. of the Entire Freight Car Equipment of this country.

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THE

AMERICAN BRAKE COMPANY.

NEW YORK OFFICE, 160 Broadway, JOHN B. GRAY, Agent.

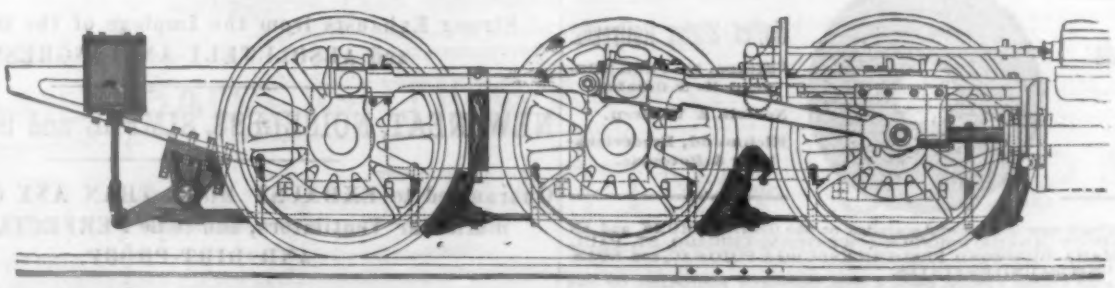
THE WESTINGHOUSE AIR BRAKE CO., Lessee,

MANUFACTURERS OF

CHICAGO OFFICE, GRAND PACIFIC HOTEL.

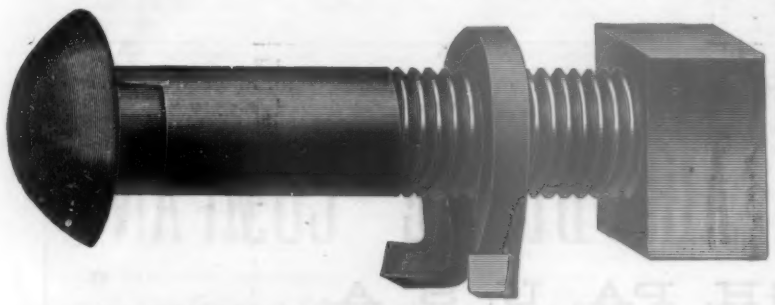
LOCOMOTIVE BRAKES.

General Offices and Shops, Second and Tyler Sts., ST. LOUIS, MO., U. S. A.



Standard Outside Equalized Pressure Brake, for two or more pairs of Drivers furnished to operate with either STEAM AIR or VACUUM.

THE "STANDARD" NUT LOCK



Manufactured under D. O. Ward's Patents by the

STANDARD NUT LOCK CO.,

NOS. 236-248 BANK ST., NEWARK, N. J.

SAMPLES FREE.

This nut lock is presented on its merits as the best and cheapest device for securing track joints.

It is a torsional loop made of good quality of tempered spri g steel, having horison tally inclined foot pieces, which are curved inward, thereby gr atly increasing the spring resistance and acting simultaneously; rests upon the base of angle bar, or underlying rail base in case of fish plate, preventing the loop portion from rotating and hammering down *thread* of *bolt*.

The nut lock for ¾ bolt made of ¼ in. square steel, standard pattern, yields a tension of 4,300 lbs. on the bolt, which is sufficient to reduce the wear of the bearing surfaces of the angle bars on the rails, imparting, as it does, a uniform bearing the entire length of the bar.

The "Standard" Nut Lock has sufficient elasticity to maintain a tight joint, which cannot be truthfully said of many light-weight single coil washers.

The "Standard" Nut Lock is, in its superficial form, similar to an annular coil twisted out of plain, *i. e.*, the curved shoulders or ends of the loop proper are spread in the usual manner of spring coils, at which bearing points the locking friction is equal to that of the best single coil washer, and added to this it is terminated in *inwardly curved* extensions, which must apparently furnish additional short leverage spring force of a torsional character.

Distinctive Merits of the "Standard" Nut Lock, Condensed:

Fixedness of position—cannot rotate and hammer down threads of bolt.

Cannot get one end into elongated slot of angle-bar.

Unlike any perma ntly placed, double washer, the Standard *is* interchangeable regardless of distance between bolts.

Cannot be put on wrong side out, as the outward projection of the foot pieces would prevent the nut being turned up.

Has more spring power directly under the nut than any two ordinary coil nut locks.

Being fixed in position it offers double the locking friction of nut locks, which when in their *dead* "set" condition turn back with nut by the vibrative effect of passing train.

The "Standard" Nut Lock embodies the old principle of spring power improved by overcoming the objection to the double washer or nut lock, and covering the weak points of the single coil washer.

THE STANDARD COMBINATION TIE PLATE AND BRACE

POSSESSES THE FOLLOWING MERITS:

1. It prevents absolutely the canting of the rail into the tie, thereby greatly increasing the life of the tie.
2. It prevents the rails from spreading or canting over and wearing one side only.
3. The combination of the brace and plate obviates the necessity of spiking the rail and brace separately, thereby saving two spikes and securing the service of the *inside* spike for *holding* the rail; it also prevents the rail from working up and down, and laterally, thus making it impossible to wear the *neck of the spike*.
4. The plate and brace being made of malleable iron, is practically indestructible.

The tie plate and brace is especially useful for curves and guard rails, and also on bridges, whether the rail is laid on ties or on stringers. A tie plate without a brace will not save the head of the spike. A brace without a tie plate will not save the tie, and in a short time the rail will wear into the tie.

P. O. Box 288, PHILADELPHIA, PA. WILLIAM H. PHILLIPS.

Simple. Easily Applied. Very Effective.

THE NATIONAL LOCK WASHER

THE ONLY POSITIVE NUT LOCK IN COMBINATION WITH ELASTICITY.

Sixty Millions in Use in Railroad Track.

For Use on All Kinds and Classes of Work.

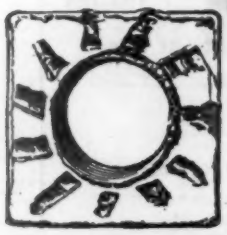
Made for all sizes of bolts.

A trial is requested.

Samples free of expense.

THE NATIONAL LOCK WASHER CO, Newark, N. J.

THE AMERICAN WASHER & MANUFACTURING CO.



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THE AMERICAN "HARVEY RIBBED" NUT LOCK.

Patented.

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This is a positive lock, with spring temper, and will not cut thread of nut or bolt.

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These Nut Locks have been adopted by the New England Road-Masters, in Conventions held at Hartford, Conn., Oct. 19 and 20, 1887, and Boston, Mass., Aug. 15 and 16, 1888, as the best Nut Locks known.

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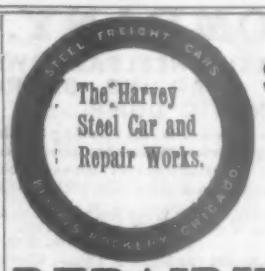

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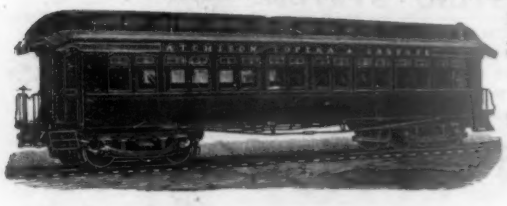
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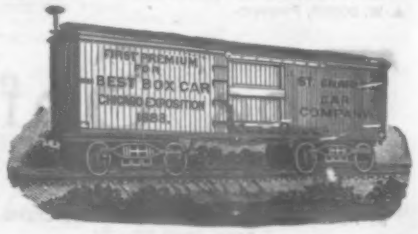

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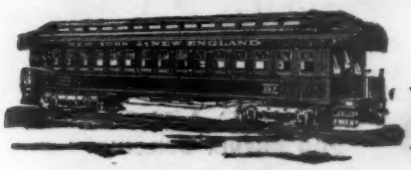
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FREIGHT SERVICE.
Chilled Car Wheels of the Highest Grade only. Axles, Iron and Brass Castings. Capacity: 20 Cars and 400 Car Wheels Daily.
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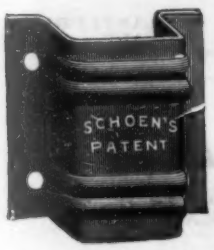

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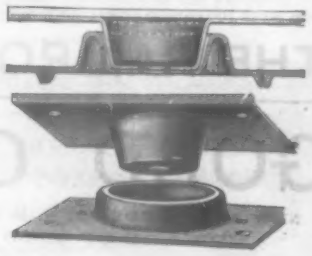

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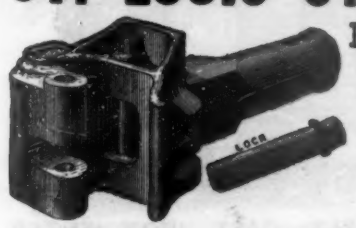

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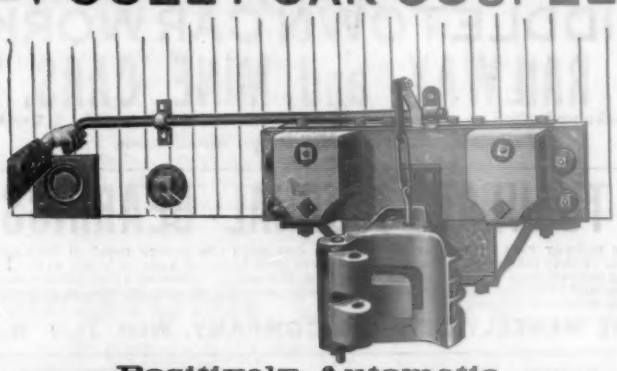

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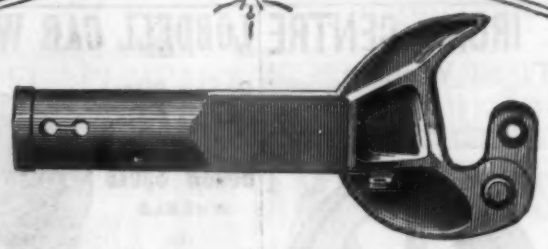

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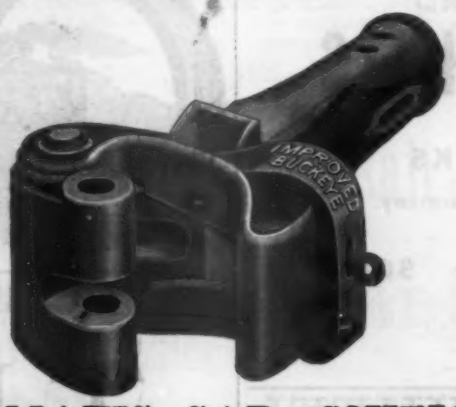

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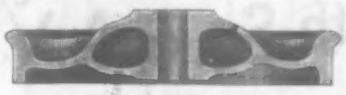

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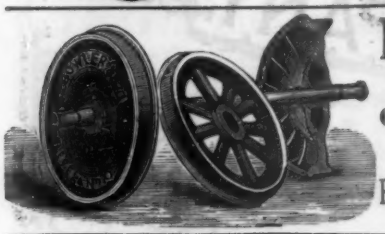

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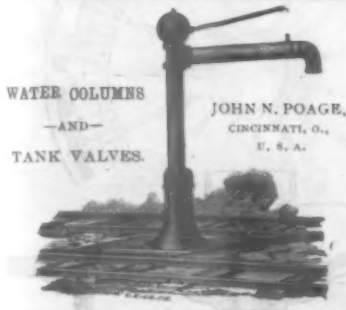

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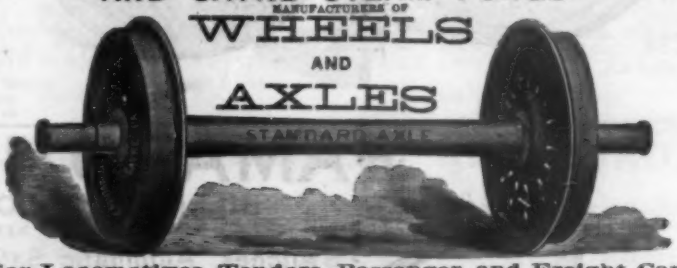

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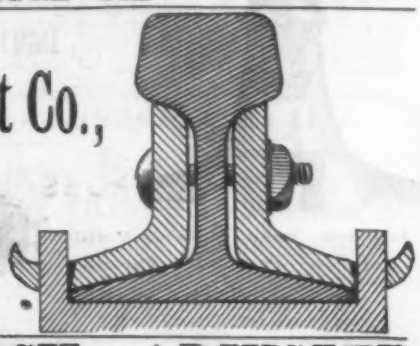

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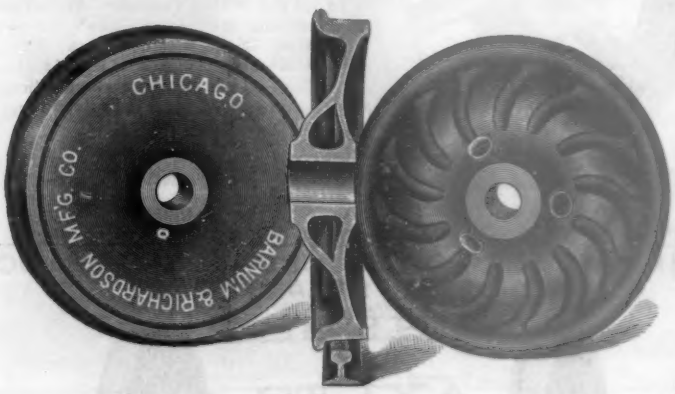

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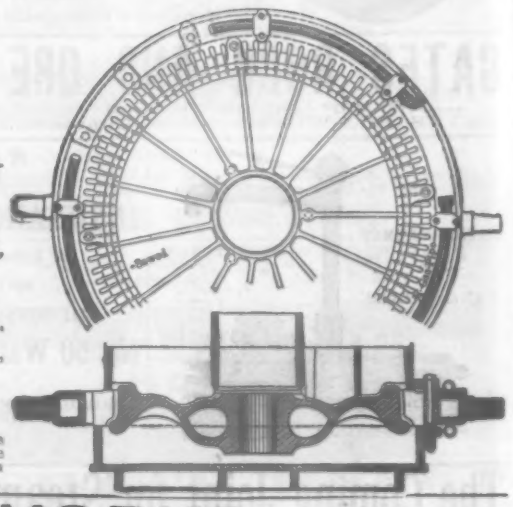

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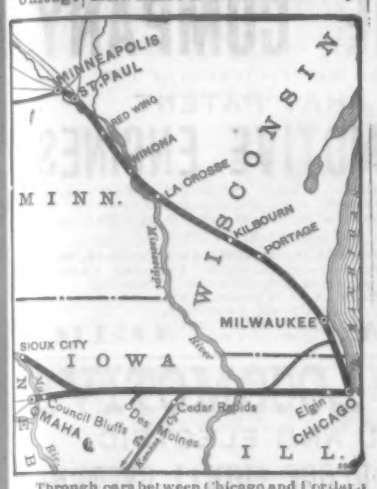

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*3:00 p. m.—The "White Train."—Runs daily, including Sundays.

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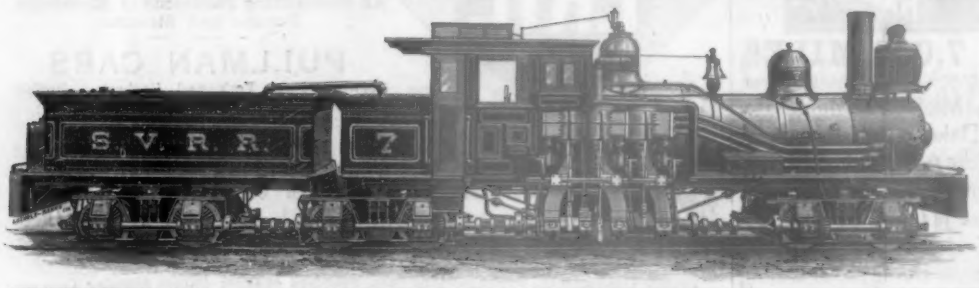

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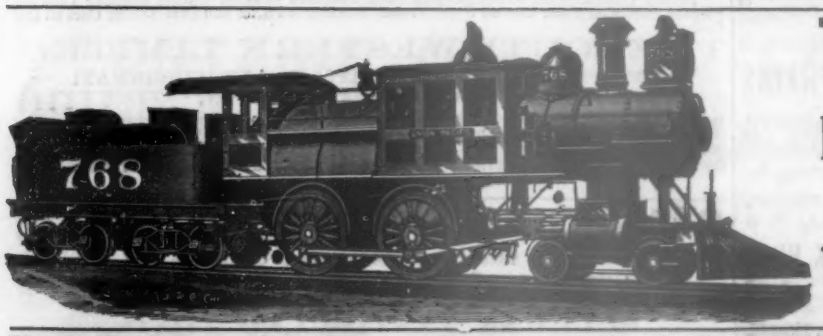

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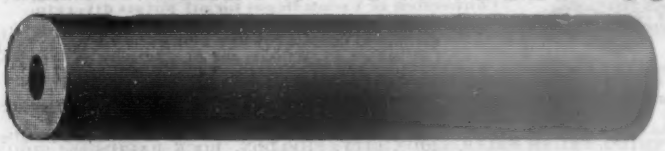

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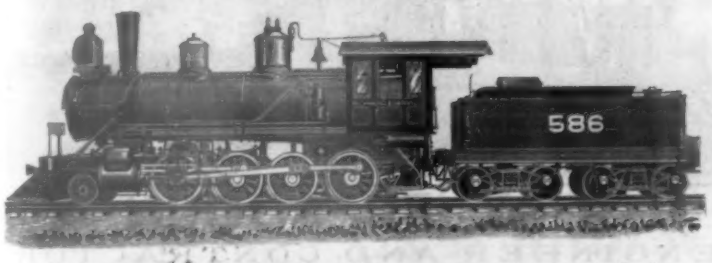

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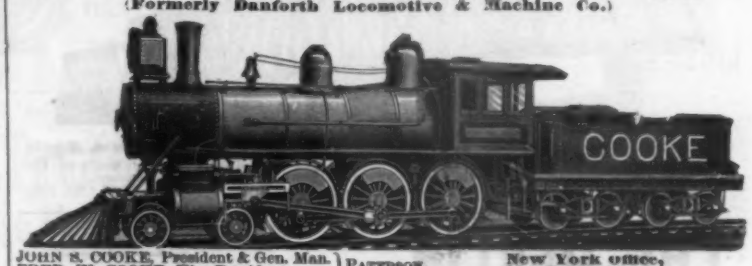

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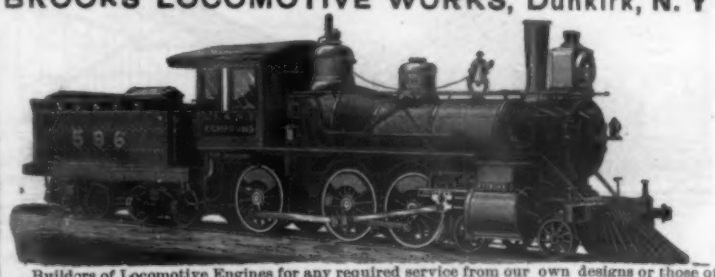

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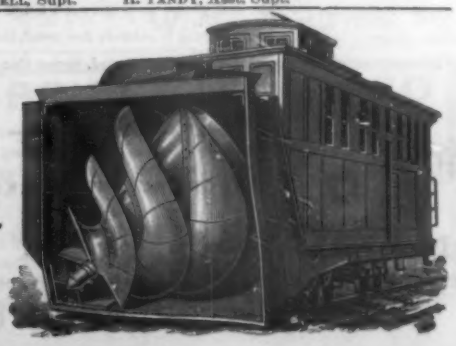

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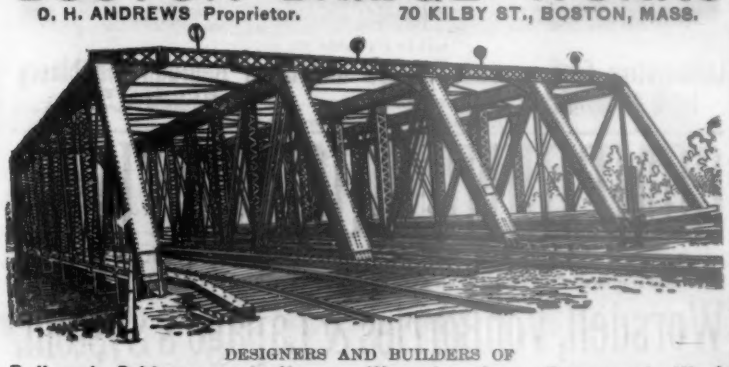

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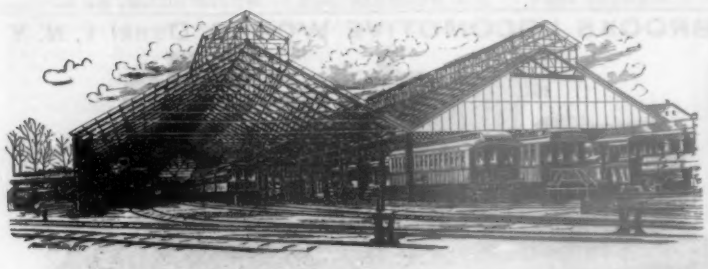

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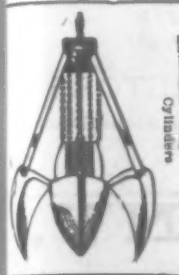

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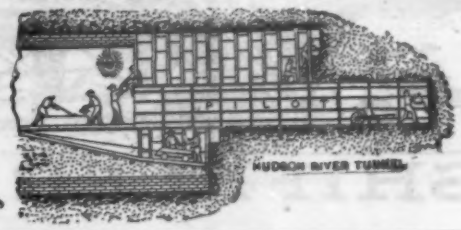

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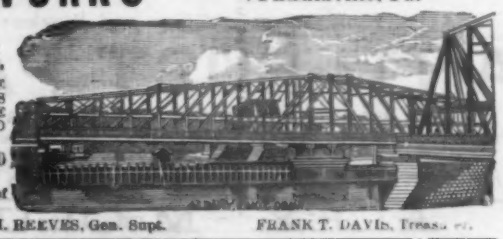

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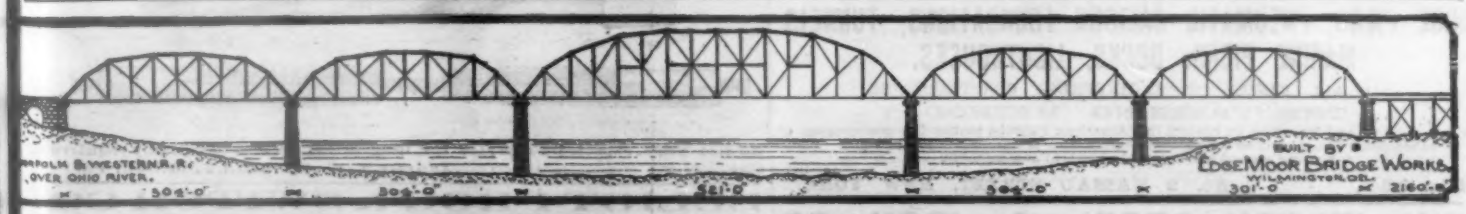

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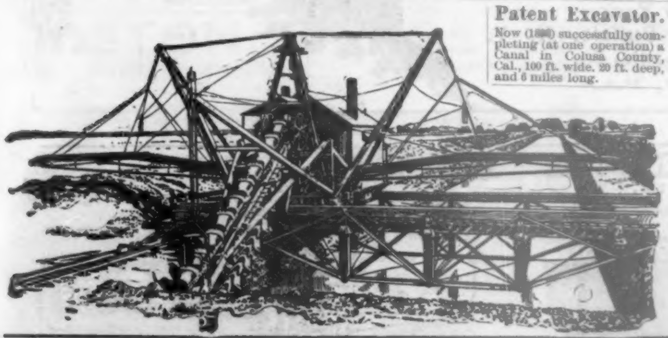

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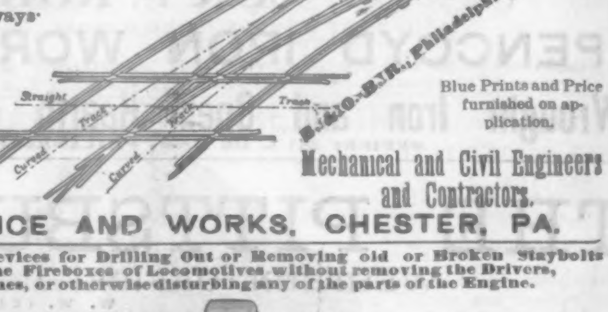

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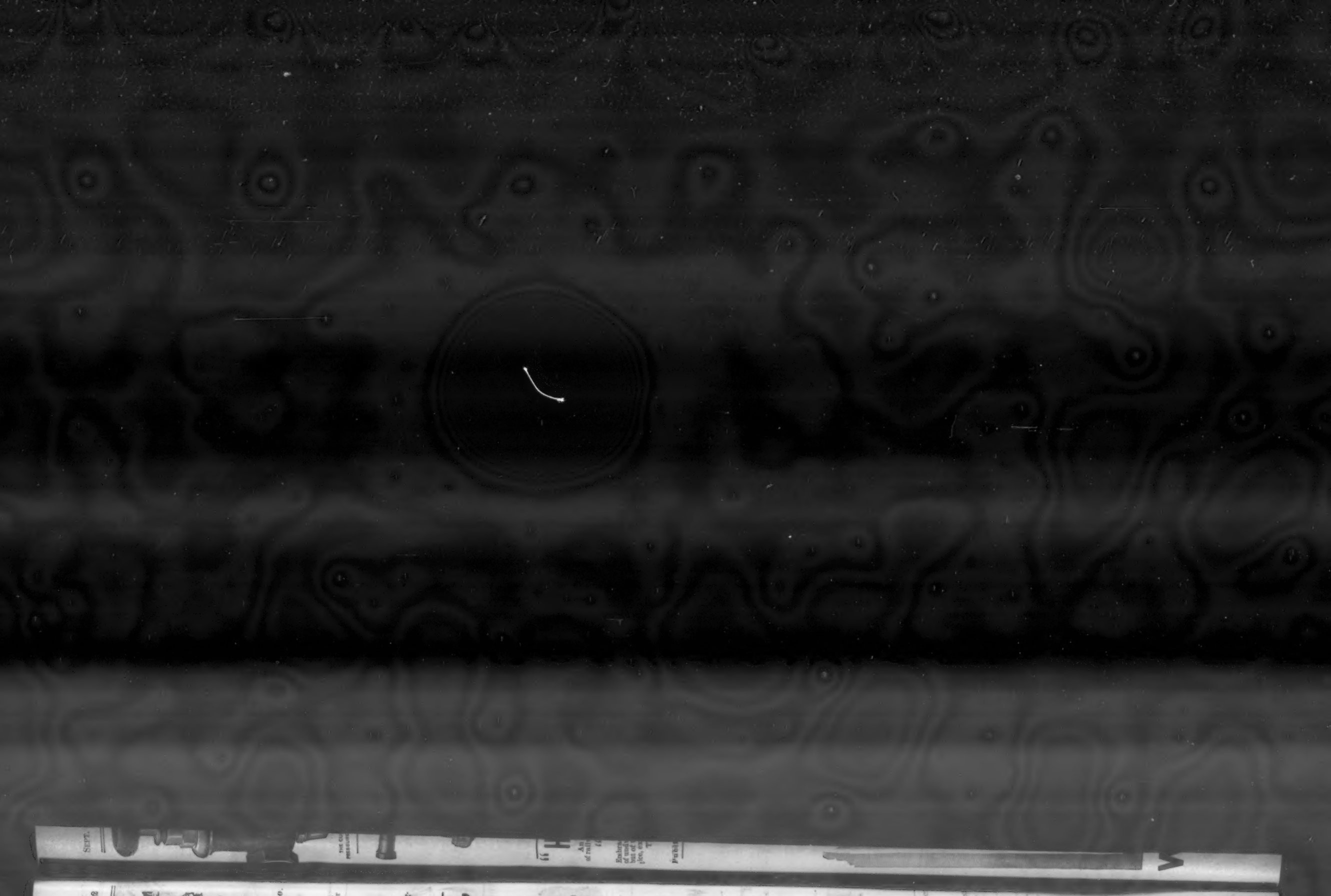

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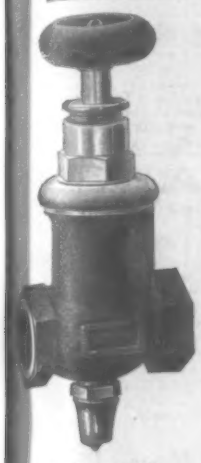

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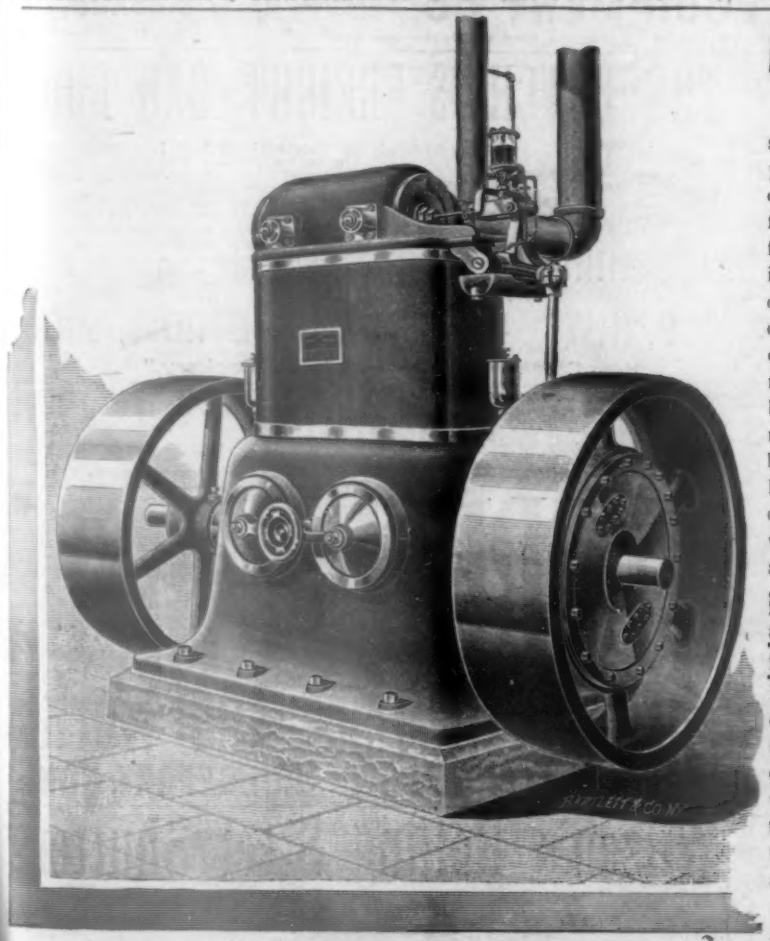

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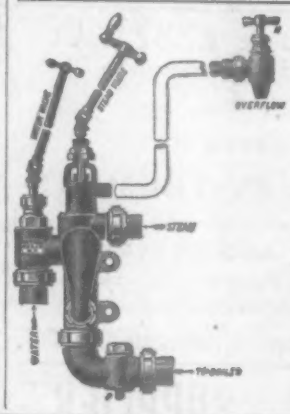

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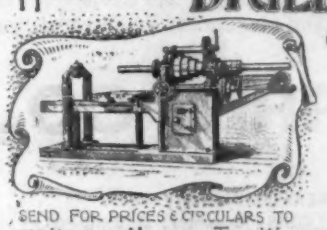
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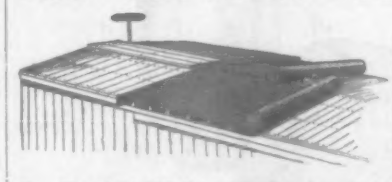
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